APPENDIX N

HISTORIC STRUCTURES REPORT

PREPARED BY MEYER BORGMAN JOHNSON

2016

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HISTORIC STRUCTURES REPORT
STRUCTURAL SECTION
PEAVEY PLAZA
MINNEAPOLIS, MINNESOTA

Prepared for: Miller Dunwiddie Architecture

Prepared by: Michael Ramerth, P.E; Elizabeth Kinney, P.E.

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July 18, 2016

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EXECUTIVE SUMMARY

The purpose of this report is to provide a structural review of Peavey Plaza that will be included in the Historic Structures Report prepared by Miller Dunwiddie Architecture. This report includes a review of the existing structural drawings and a site conditions survey. We also discuss a petrographic study that was performed on three concrete samples, and we recommend some non-destructive testing that will inform any future work that will be undertaken. Lastly, we include recommendations for preservation or restoration of the Plaza. Observations of the existing structure were conducted by Meyer, Borgman, Johnson employees Mike Ramerth and Elizabeth Manning on October 27th 2015 and by employee Elizabeth Kinney on December 15th, 2015.

EXISTING DRAWINGS

Meyer Borgman Johnson was provided with copies of drawings from the original design documents and the original shop drawings of the steel reinforcement. Copies of these documents are included in Appendices A, B and C.

- Appendix A: Sheets SP-1. SP-1A, SP-8 and SP-9 by M. Paul Friedberg & Associates dated 9.21.1974
- Appendix B: Sheets R2, R3, R4 and R5 by Cowin & Co., Inc. dated 7.29.1974
- Appendix C: Specifications for Peavey Park Plaza by M. Paul Friedberg & Associates, dated 1974
- Appendix D: Petrographic testing report by American Engineering Testing, 2016

Sheet SP-1A contains general notes about construction of the plaza.

Sheet SP-1 shows the general site plan of the plaza and is used as a key for locating photographs taken on site.

Sheets SP-8 and SP-9 show sections and details of the concrete construction, including walls, stairs, pavement, benches, tree pits, pool bottom, and bridges.

Sheets R2 through R5 are shop drawings of the south west corner of the plaza and the corner of the plaza at 12th street and Nicollet Avenue. They show the concrete reinforcement for the concrete work in this area.

MODIFICATIONS FROM ORIGINAL DESIGN

There have been some changes to Peavey Plaza since the original construction in 1974:

Upper North Plaza: The northern part of the plaza has seen the most changes. The upper plaza that borders 11th street was originally brick pavement, but was replaced with a concrete slab in 1998. Many trees have been removed, and in several locations a tree has been replaced with a lamp post, see photograph 1. Also, a grouping of 9 benches was removed completely in this area.

Photograph 1: North Plaza

Lower North Plaza: The retaining wall in the north east plaza was original to the 1974 design. IT separated the plaza from the Orchestra Hall building. However, during the addition to Orchestra Hall in 2012 it was partially removed and reconstructed. The northernmost section is original and has a finish that is consistent with the rest of Peavey Plaza. The replacement wall is the southern section and it has a flat finish and is obviously different in character, see photograph 2.

Photograph 2: North Plaza looking south east

General Comments: Throughout the plaza there have been benches and trees removed, although nowhere to the same extent as in the northern section. There have been no major changes to the structure, apart from the retaining wall mentioned above.

FIELD OBSERVATIONS OF STRUCTURAL CONDITIONS

General Comments: In general, the condition of Peavey Park Plaza is very good, especially considering its age, exposure to weather and water. In areas where water from the fountains has been regularly flowing over the concrete surface the concrete is discolored and is now tinted brown/gold, see photograph 3. There has also been some surface past erosion.. The change in color is noticeable, but is consistent throughout the Plaza. There are many areas of minor concrete deterioration with some cracking and spalling evident, but few areas of major damage. Typically, expansion joints were initially caulked but now the caulk has failed and is allowing water to penetrate the structure, see photograph 5. A key plan has been provided to show the location of all photographs, see figure 1.

North plaza (corner of 11th street and Nicollet Ave): There are some areas of damaged concrete in this part of the plaza. In several places the concrete stair treads have sections of concrete missing, typically between 2" and 8" in length, see photograph 5. There are also several cracks in the stair treads, typically at corners, see photograph 6. The cracks range in size from 1/16" to 1/4". There are several locations where the caulk in the expansion joints has failed and is in need of repair, see photograph 4.

Photograph 3: Concrete color change

Photograph 4: Caulk in joint failing

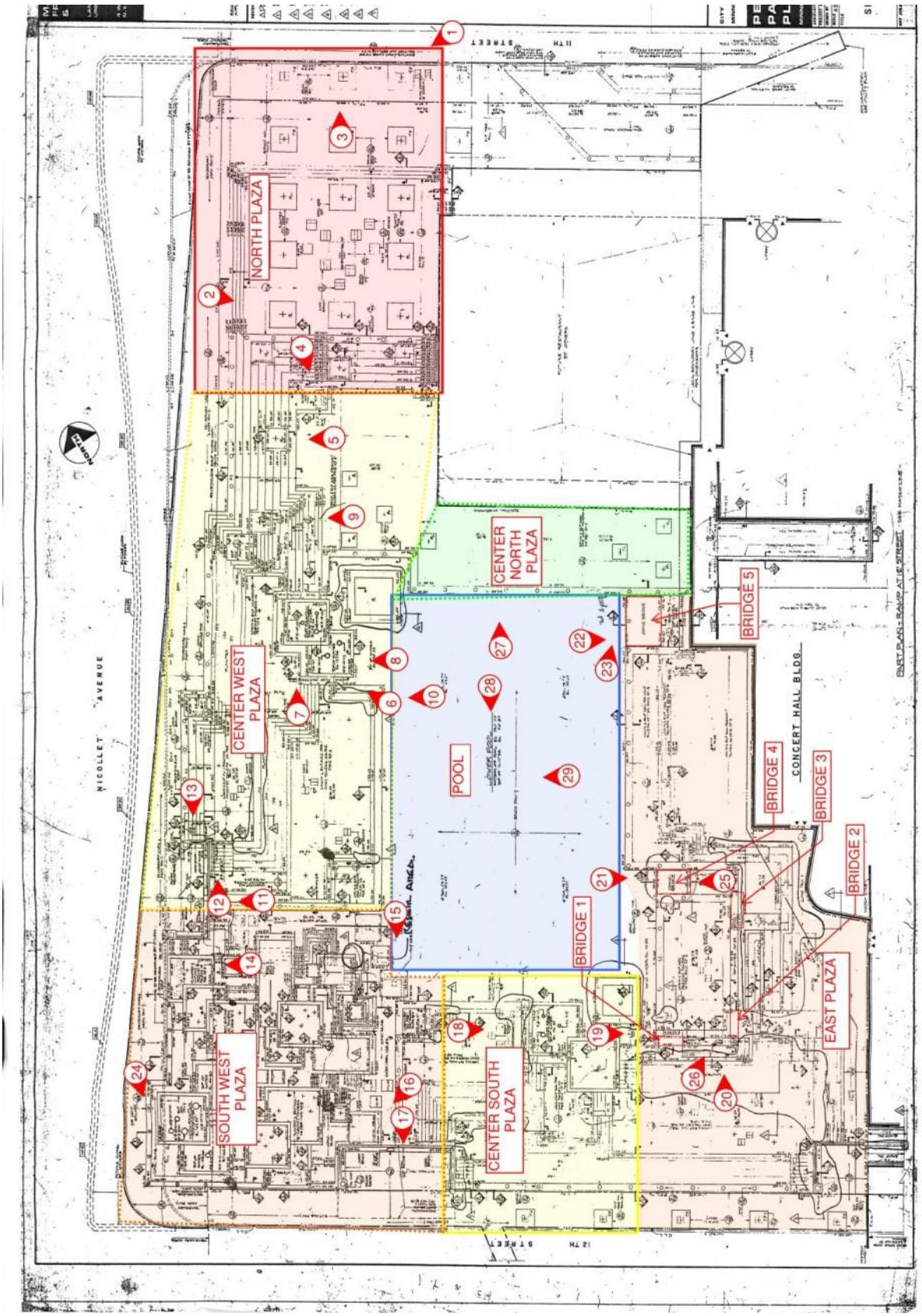


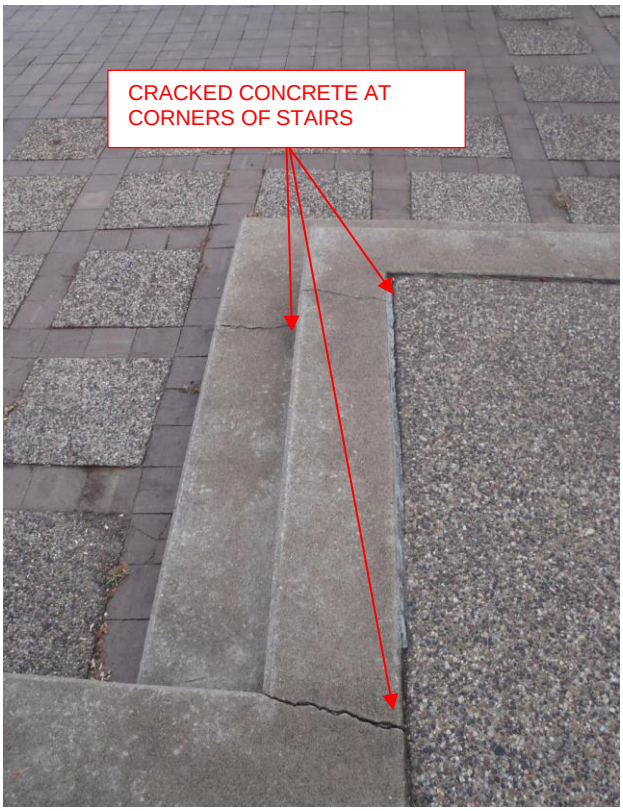
Figure 1: Key plan for lay out of plaza and location of photographs.

Center West plaza (along Nicollet Ave): This section of the plaza is showing some of the most significant concrete deterioration. Specifically, the lower section of the East fountain has two areas where concrete is spalling, one at the south west corner and the other along the south wall, see photographs 7 and 8. Also, there are many cracks with efflorescence, see photograph 9. There are some minor vertical cracks in the low retaining wall to the north of the fountain, but there is no efflorescence at these cracks, see photograph 10.

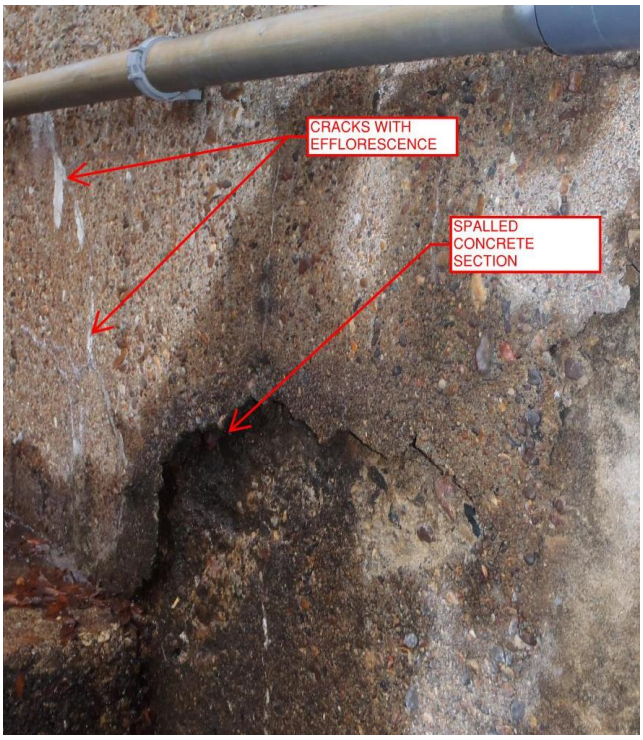
At the stair sections there are cracks at corners similar to those in the North Plaza area, see photo 11. There are also some stair treads that have been damaged and repaired, see photograph 12. At the attachment points of the upper railing along the Nicollet Ave sidewalk the concrete is cracked. At present, the width of the cracks is very small, but it does extend for several feet down through the concrete wall, see photograph 13. Also, in this area there is a crack extending full height at the corner of this retaining wall. The width of this crack is approximately 1/8", see photograph 14.

South West plaza (corner of Nicollet Ave and 12th Street): There is one large crack (approx. ¼") at one of the water features. There was water seeping from the crack and the surrounding concrete was discolored, see photograph 15. At present there is minimal concrete spalling in this location.

Photograph 5: Stairs at north plaza



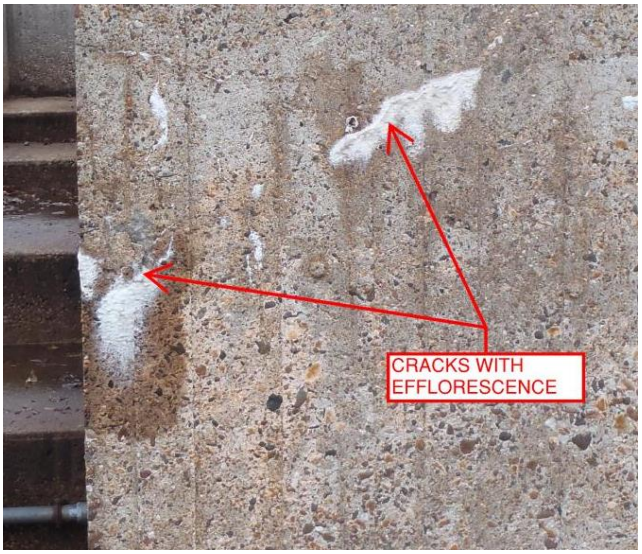
Photograph 6: Stairs in N plaza with cracking



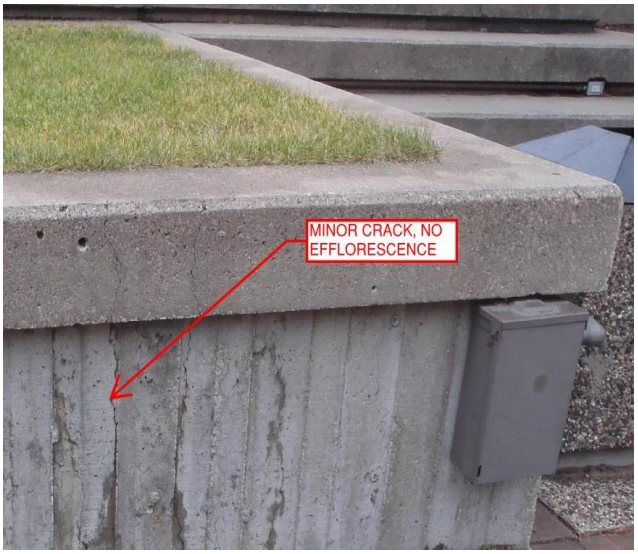
Photograph 7: Damage at East Fountain

Photograph 8: SW corner of East Fountain

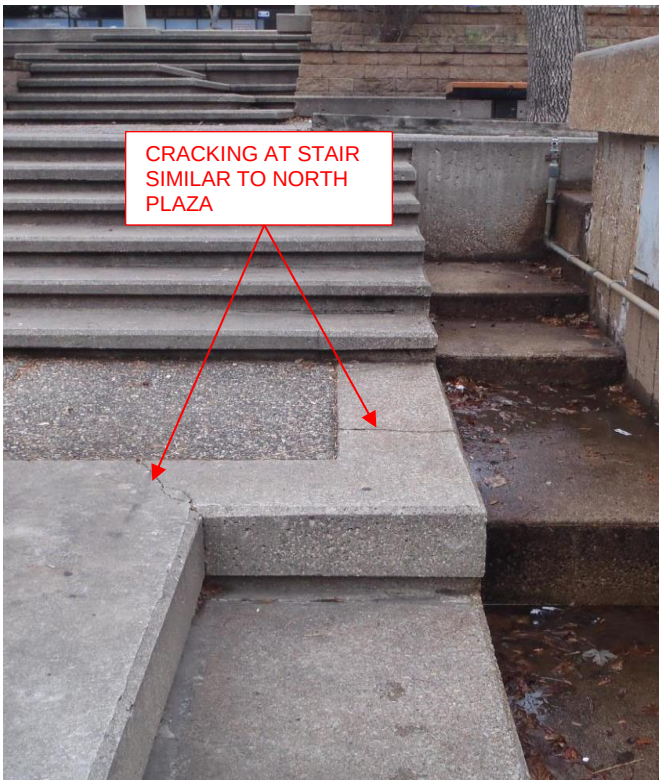
At an expansion joint in the slab edge by the pool there is significant concrete spalling and exposed rebar, see photograph 16. This had been patched, but now the repair has failed too. One of the stepped waterfalls along the 12th Street side has some exposed and rusting rebar, see photograph 17. The concrete spalling is quite localized and was probably due to insufficient concrete cover to the rebar. Along the edge of the sidewalk at Nicollet Avenue there is a row of bollards that has significant cracking in the concrete beam between them, see photograph 18.



Photograph 9: Cracks with efflorescence



Photograph 10: Minor cracks in retaining wall

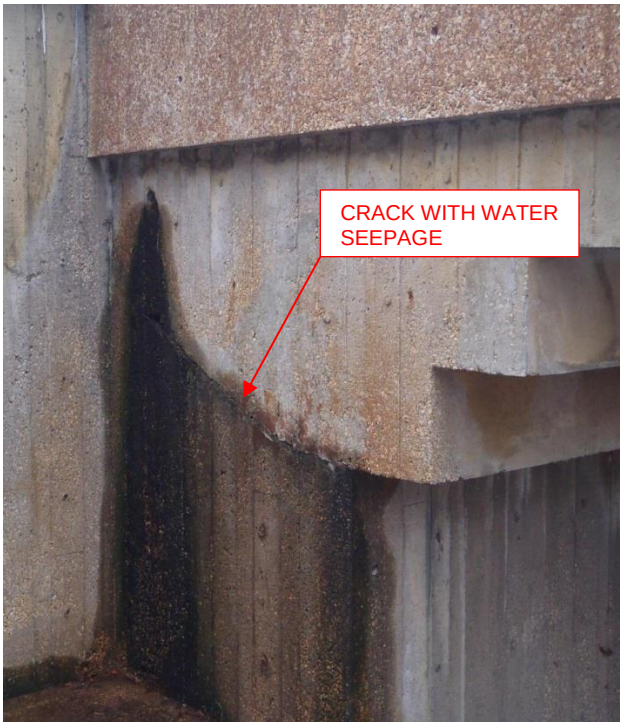


Photograph 11: Cracks at Stair corners

Photograph 12: Damaged stair treads

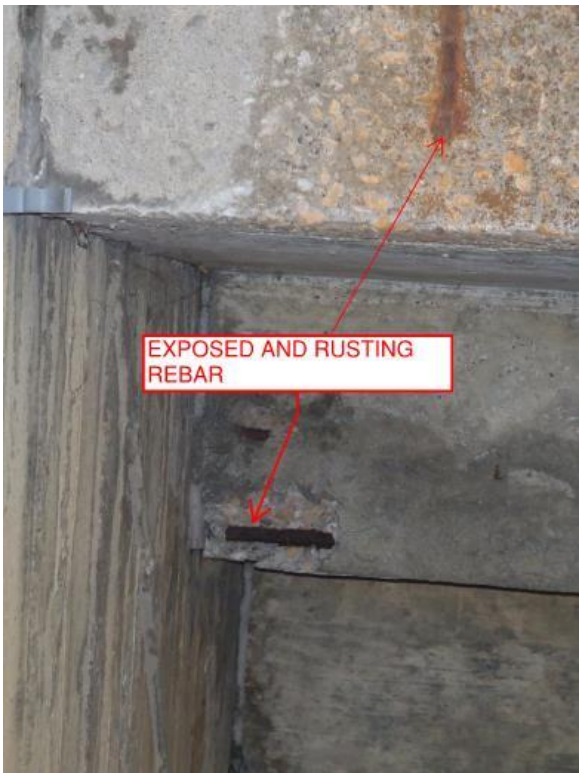
Photograph 13: Crack at railing

Photograph 14: Retaining wall crack



Photograph 15: Crack with seepage at SW corner

Photograph 16: Damage at pool edge



Photograph 17: Exposed rebar

Photograph 18: Cracked concrete at bollards

Photograph 19: Cracks with efflorescence

Photograph 20: Underside of small bridge

Center South plaza (12th Street): At the lower fountain in this area there are some hairline cracks with efflorescence, see photograph19. None of the cracks are significant, but the efflorescence is unsightly.

East plaza (along Concert Hall building): This section has five bridges, several of which are in need of repair. Three of the bridges are approximately 4'-4" wide and 10' long, a section through them is shown in Figure 2. There is little clearance under these bridges and visibility was limited, so the full extent of deterioration could not be viewed. The two southernmost bridges, shown as bridges 1 and 2 on the key plan, are in good condition, see photographs 20 and 21. The southwest bridge, shown as bridge 3 on the key plan, still has its plywood formwork in place, so it was not possible to see the condition of the concrete under the slab. The side walls are in good condition apart from the south east support where the corner of the concrete has been damaged and is missing, see photograph 22. It appears that a repair of this area was attempted, but has failed.

The two larger bridges span approximately 7' and 12'. The shorter bridge, shown as bridge 4 on the key plan, has concrete side walls that have spalled and been repaired, see photograph 23. The underside of the bridge deck also has some spalled concrete, see photograph 24, but it was not possible to determine the condition of the side walls or the deck for the full length of the bridge. The larger bridge, bridge 5 on key plan, is in worse condition than the smaller bridge. In addition to spalling side support walls, see photograph 25, the underside of the bridge deck has severely rusting rebar and spalling concrete, see photograph 26. Again, it was not possible to determine the full condition of the deck or side support walls for the full length of the bridge.

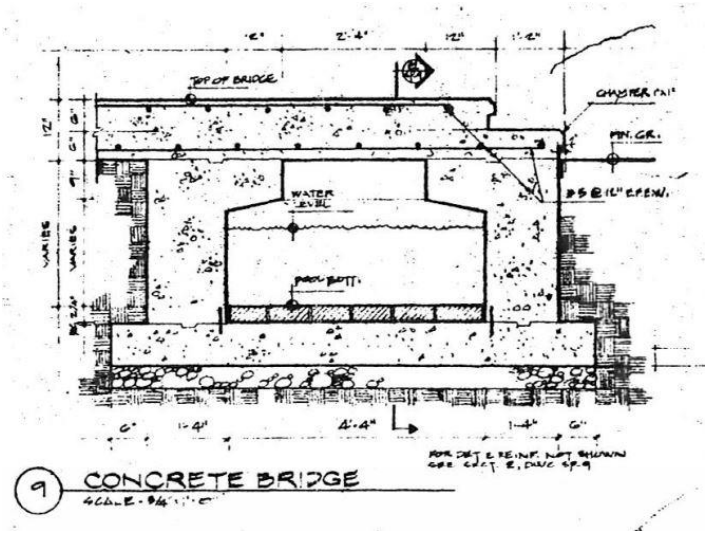
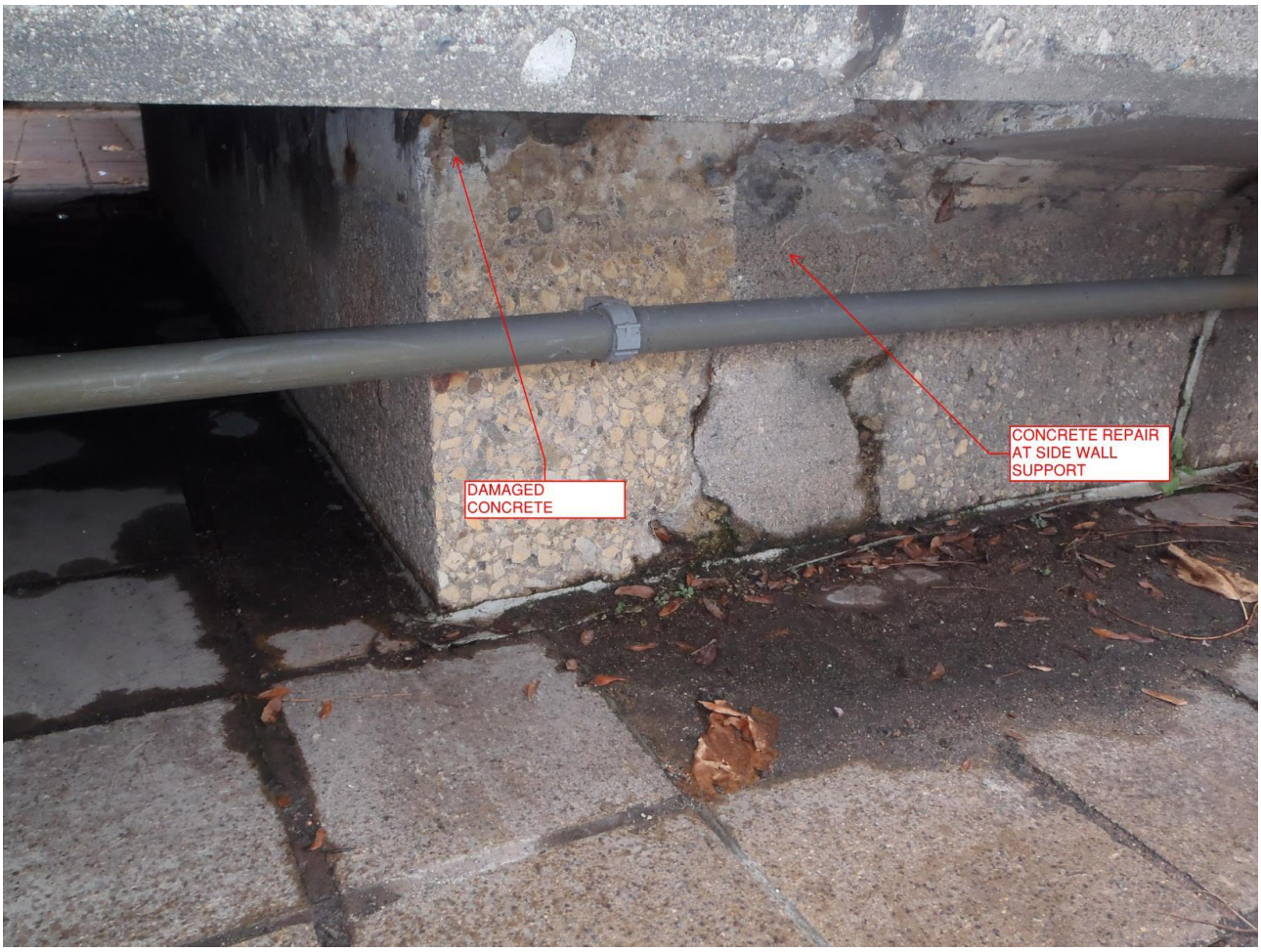


Figure 2: Section 9 on SP-9

Photograph 21: Small bridge in south of plaza

Photograph 22: Damage to bridge wall support



Photograph 23: Damage to bridge 4 side walls

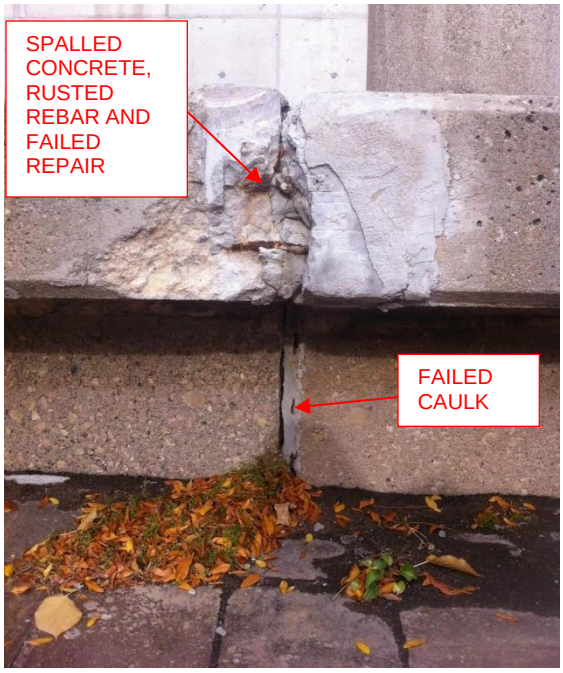
Photograph 24: Spalling concrete on underside of bridge 4

Photograph 25: Damage to side wall of bridge 5

Photograph 26: Spalled concrete and rusted rebar on underside of deck of bridge 5

Center North plaza: The main deterioration in this area is at an expansion joint in the pool edge wall, see photograph 27. The damage is similar to that seen at the south west pool edge expansion joint, with rusting rebar, spalled concrete and a failed repair.

Pool: The brick bottom of the pool is generally in acceptable condition. There is one significant crack running north-south at approximately the midline of the pool, see photograph 28. It is not possible to determine whether just the concrete has cracked, or whether the waterproofing layer below is compromised too. See figure 3 for a detail of the original pool bottom construction. In the East-West direction at the midline of the pool there is a joint between the pavers that has been caulked the full length of the pool, see photograph 29. It is not known whether the waterproofing layer in this area has been compromised as well.



Photograph 27: Damage at pool edge

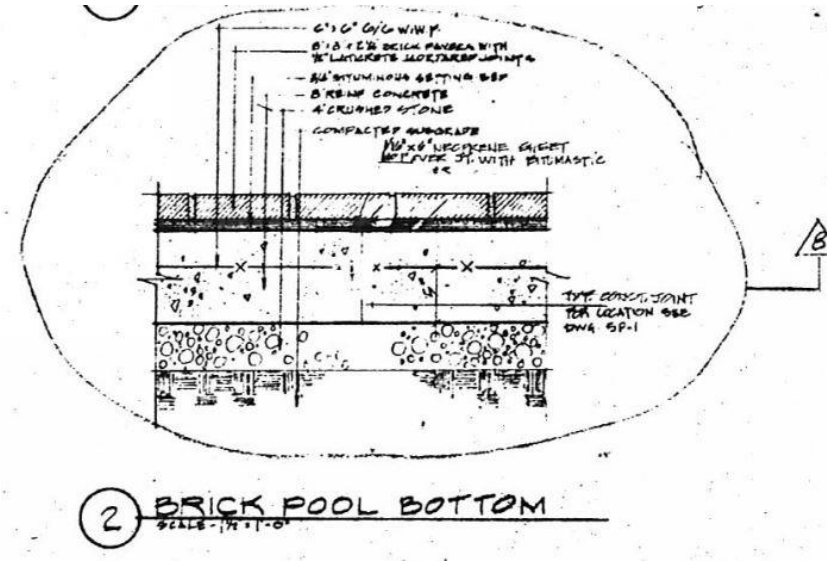


Figure 3: Original pool construction

Photograph 28: N-S crack in pool

Photograph 29: E-W crack in pool

PETROGRAPHIC TESTING

A petrographic analysis of three concrete core samples was undertaken by American Engineering Testing (AET). The results of the report are discussed with reference to the implications on the structure of Peavey Plaza, and the full report is included as Appendix D. The concrete cores taken represented three different areas of concrete present in the plaza: one from the retaining wall, one from the wall of the lower pool and one from the elevated waterfall feature.

Carbonation: In general the concrete condition was good, with very little carbonation present, ranging from 2 to 3 mm for samples 2 and 3, to 11mm for sample 1. As high carbonation levels are linked to corrosion of steel reinforcing, the low levels of carbonation present are an indicator of good condition of the concrete. When the relative humidity is between 50% and 75% carbonation occurs at the fastest rate, and can progress up to 1mm per year. The very low rate of carbonation of the concrete in samples 1 and 2 is probably a result of the concrete remaining saturated for long periods of time, which would raise the relative humidity of the concrete above 75%.

Staining: Iron oxide staining was seen at the outer surface of the concrete sample taken at the waterfall. This is consistent with our field observations of the altered color of concrete. This staining is indicative of acidic attack, with approximately 0.5mm of the paste showing surface erosion and stained reddish-brown. This has color change has no effect on the structural capacity of the concrete.

RECOMMENDATIONS

Further testing recommended:

- Pool cracks: At the two locations in the pool bottom where there is cracking, it is necessary to determine whether the water proofing membrane has been compromised. Per the original specifications for the plaza, the water proofing was a liquid applied membrane, see pages 113-116 of the specifications. The elongation is specified to be 500% minimum. This gives an indication that the membrane is capable of considerable deformation, however, whether it ruptured at the cracks needs to be determined.
- Cracks with efflorescence: The presence of efflorescence indicates that there is water migrating out through the concrete. The source of water should be identified. It is most likely that water soaks into the dirt behind the wall and then leaches through the concrete. From the note 7 on drawing SP-1 it is known that the interior face of the concrete pit structures that contain soil was damp-proofed. It is probable that this surface has failed and is permitting water to migrate. Alternatively, it is possible that there is vertical migration of water through the concrete wall itself, but this is less likely. It is also recommended to determine non-destructively the extent of rebar corrosion at these areas. The level of corrosion will affect the choice of repair.

General Repair Recommendations:

The recommended repairs discussed below are general in nature and need to be fully developed by a structural engineer before any work is undertaken.

- Caulked joints: In any location where the caulk has failed it must be replaced. The type of caulk must be approved and the concrete must be thoroughly prepared per the specifications so the caulk will adhere to the surface, see Figure 4 for the original detail:

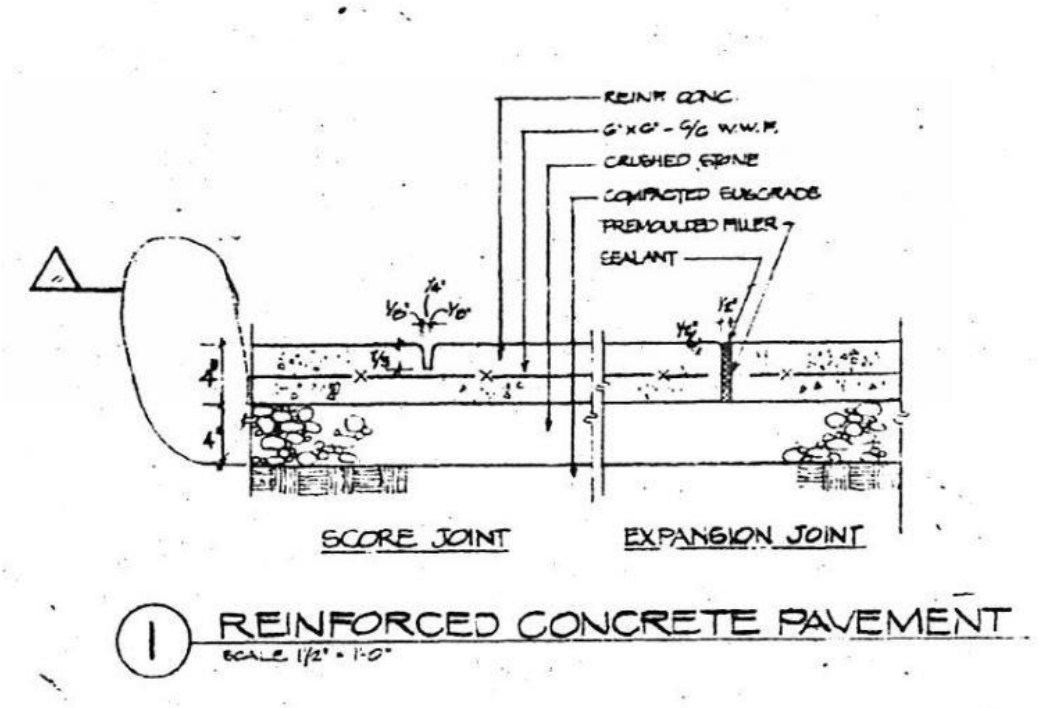


Figure 4: Original reinforced concrete pavement detail, Detail 1, SP-9 in Appendix A

- Cracks with efflorescence: At any crack showing efflorescence it is recommended that the efflorescence be removed according to the National Parks Service Preservation Brief 15 which details the preservation of historic concrete. It is important that during this process the surface of the concrete is not damaged. Secondly, the source of water should be identified and eliminated. This will probably require at a minimum reapplying waterproofing membranes. Thirdly, it is recommended that the level of rebar corrosion be determined as this will inform the type of concrete repair required. If it is determined that the rebar is corroded inside the concrete there are several measures that could be taken to reduce future spalling of the concrete. These methods could include cathodic protection, re-alkalization or application of a migrating corrosion inhibitor.
- Stair treads: Several stair treads have damage to their front edge. The concrete in these areas should be removed to 1" behind the rebar and then patched with concrete of similar characteristics.

- Stair corners: The cracks at the stair corners are most likely due to the lack of an expansion joint at these locations. It is recommended that the cracks be cleaned, saw-cut straight and then caulked to prevent water infiltration at these locations.
- Concrete discoloration: The discoloration of the concrete does not affect its strength or durability. It is purely an aesthetic choice as to whether to return the concrete to its original appearance or not.

Specific Repair Recommendations:

- At two locations in the edge wall of the pool a joint has severely spalled concrete and rusting rebar, see photographs 15 and 27. It is not clear whether this is a score joint, or an expansion joint. The presence of rebar across the joint, and the fact that the original specifications call out that "All corners shall be built monolithic, the work on each side extending such distances as directed", indicate that it is likely that the joint is a score joint, and not a true expansion joint. The concrete should be removed in the area and the rebar should be treated with a migrating corrosion inhibitor to prevent further rust forming. The concrete may then be repaired with concrete of similar characteristics.
- Bridges: The deck of each of the two long bridges should be replaced. The deck slab is not cast monolithically with the side walls, Figure 5, (Section 8, Sheet SP-9), so it is anticipated that it should be possible to replace the deck without impacting other components of the bridge.

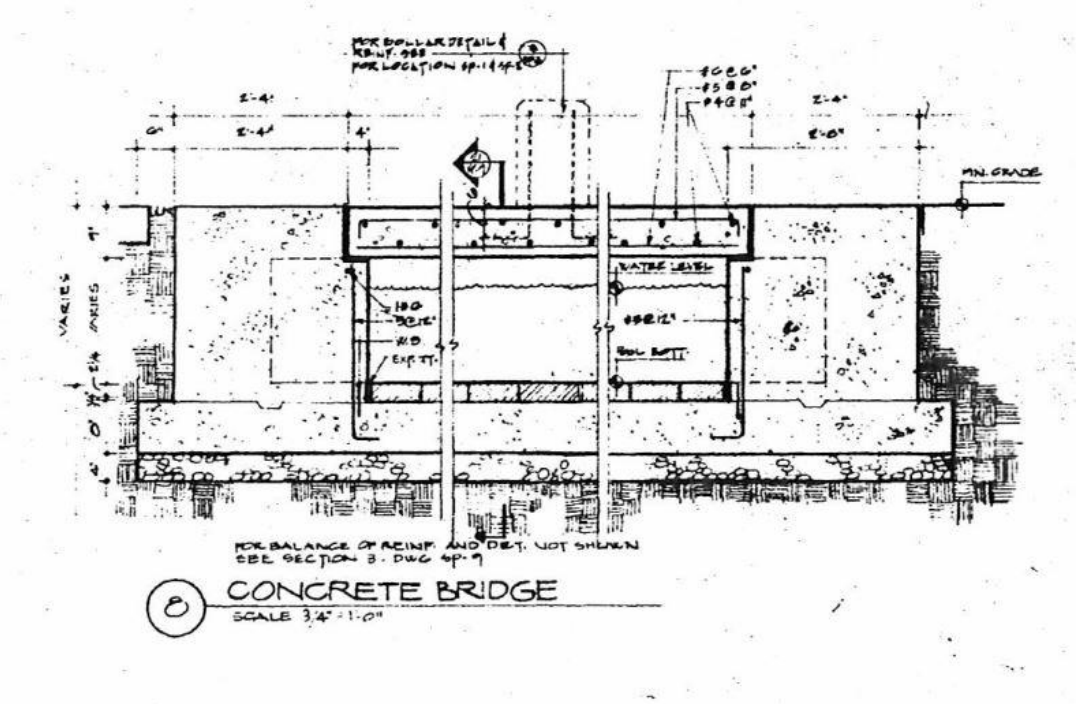


Figure 5: Original detail for reinforced concrete bridge, Detail 8, SP-9 in Appendix A

- East Fountain: The spalled areas of concrete should be removed and the rebar treated with a migrating corrosion inhibitor. The concrete should then be patched with a concrete of similar characteristics.
- Pool cracks: The full extent of cracking in the pool base should be determined as there could be other cracks that are present but less obvious. After determining whether the waterproofing membrane is still intact, the cracks, and membrane if necessary, should be repaired.
- Retaining wall in west plaza: This retaining wall has a crack extending almost the full height of the wall at the corner. This is most likely due to differential movement between the walls at the corner.
- Railing connections at west plaza: The railing detail is shown in Figure 6, and is taken from Detail 5, SP-8. The original specifications for the railing connection in section 0270.8 HANDRAILS AND RAILINGS calls out for "Vertical members shall be galvanized sold steel bars of sizes called for on the Drawings." The installation is specified to be "Install handrails and railings in previously prepared sleeve as shown on the drawings…. Grout vertical members into sleeves with "Quick-Rok" and sealant as manufactured by Preco Chemical Corp., or approved equal". It is possible that the galvanizing protection is no longer effective and that the steel is rusting. As steel rust puts an expansive force on concrete, this could be the cause the cracking seen. Further investigation of the railing attachment should be done to determine whether they are the source of damage to the concrete. If so, the railing and sleeve should be replaced with stainless steel, and the concrete repaired.

CONCLUSIONS

The structure of Peavey Plaza is in good condition with no immediate repairs required. In order to ensure the durability of the concrete over the long term two of the bridge decks should be replaced, and various areas of concrete require minor repairs. The condition of the concrete pool bottom and waterproof membrane must be investigated and repaired if the pool is to be refilled.

APPENDIX A: ORIGINAL STRUCTURAL DRAWINGS

BY M. PAUL FRIEDBERG AND ASSOCIATES
9.21.1974

GENERAL NOTES

1. SURVEY INFORMATION SHOWN ON THESE DRAWINGS FOR UTILITIES HAS BEEN OBTAINED FROM A DRAWING ENTITLED SUB-SURFACE UTILITIES SURVEY MAP OF NICOLLET AVE., TWENTIETH ST.-SO, ELEVENTH ST. SO. PREPARED BY WPA OF MO. 665-71-3-355 DATED FEBRUARY 1940. DWG. # PLAT NO. 61.

2. INFORMATION SHOWN ON EXISTING CONDITIONS HAS BEEN TAKEN FROM A SITE PLAN DWG # A2-1 PREPARED FOR THE CONCERT HALL FOR THE MINNESOTA ORCHESTRA PREPARED BY HAMMEL GREEN & ABRAHAMSON INC. ARCHITECTS & HARDY, HOLZMAN PFEIFFER ASSOC. ASSOCIATED ARCHITECTS.

3. EACH CONTRACTOR WILL BE HELD RESPONSIBLE FOR HIS WORK. ANY DISCREPANCIES IN THE PLANS OR DETAILS SHALL BE CALLED TO THE ARCHITECTS ATTENTION. ALL DIMENSIONS SHALL BE VERIFIED BY CONTRACTORS BEFORE STARTING WORK OR FABRICATION.

4. ALL ELEVATIONS REFER TO THE DATUM USED BY THE CITY OF MINNEAPOLIS.

5. SOIL CONDITIONS WILL BE VERIFIED BY INSPECTOR AFTER EXCAVATION, AND REPORT OF INSPECTION SUBMITTED PRIOR TO PLACING FOUNDATIONS.

6. DRAWINGS SHALL NOT BE SCALED. USE PRINTED DIMENSIONS FOR ALL CONSTRUCTION.

7. OUTSIDE FACES OF ALL EXTERIOR FOUNDATION WALLS THAT ARE IN CONTACT WITH SOIL SHALL BE DAMPPROOFED AS SPECIFIED.

8. FLOORS, PLAZAS, ETC., PROVIDED WITH DRAINS SHALL BE PITCHED TO DRAINS EXCEPT AS OTHERWISE NOTED.

9. PARTITIONS SHALL NOT BE BUILT TO FULL HEIGHT UNTIL ALL DUCTS, PIPES, ETC., ARE IN PLACE. EQUIPMENT ROOM PARTITIONS SHALL NOT BE BUILT UNTIL EQUIPMENT IS IN PLACE

10. SIZE & LOCATION OF CONCRETE PADS FOR MECHANICAL EQUIPMENT, TANKS, PUMPS, ETC. SHALL BE VERIFIED WITH MECHANICAL CONTRACTORS BEFORE PLACEMENT OF CONCRETE.

11. ALL EXPOSED CONCRETE CORNERS SHALL HAVE A ¾" ROUNDING UNLESS OTHERWISE SHOWN

LEGEND

- PROJECT PROPERTY LINE
- CONTRACT LIMIT LINE
- LEGAL BOUNDRY LINE
- MATCH LINE
- EXISTING GRATE
- EXISTING MAN HOLE
- PROPOSED CATCH BASIN
- STREET CATCH BASIN (SEE PLUMBING DWGS.)
- PROPOSED DRAIN
- CENTERLINE
- PLANTED
- PROPOSED TREE
- LEGAL GRADE
- EXISTING SPOT ELEVATION
- NEW SPOT ELEV.
- EXISTING CONTOUR
- PROPOSED CONTOUR
- ELEVATION
- SECTION
- BANNER POLE WITH LIGHT
- TREE LIGHT
- EXISTING LIGHT TO REMAIN
- TRAFFIC SIGN
- PARKING METER
- BOLLARD
- LIGHT BOLLARD
- BANISTERS

ABBREVIATIONS

ALUM.	ALUMINUM
ARCH.	ARCHITECTURAL
A.C.P.	ASBESTOS CEMENT PIPE
ASPH.	ASPHALT
@	AT
B & B	BALL AND BURLAP
BRK.	BRICK
CAL.	CALIPER
C.I.P.	CAST IRON PIPE
C.B.	CATCH BASIN
℄	CENTER LINE
C.C.	CENTER TO CENTER
CL.	CLEARANCE
C.W.	COLD WATER
CONC.	CONCRETE
C.L.L.	CONTRACT LIMIT LINE
DET.	DETAIL
Ø	DIAMETER
DIA.	DIAMETER
D.	DOWN
DR.	DRAIN
DWGS.	DRAWINGS
ELEC.	ELECTRICAL
EL.	ELEVATION
ELEV.	ELEVATION
EQ.	EQUAL
EX.	EXISTING
EXIST.	EXISTING
EXP. JT.	EXPANSION JOINT
FIN. GR.	FINISHED GRADE
GALV.	GALVANIZED
GA.	GAUGE
HT.	HEIGHT
INV.	INVERT
L.P.	LIGHT POLE
M.H.	MANHOLE
N.	NORTH
NO.	NUMBER
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
PAV'T.	PAVEMENT
P.C.P.	POROUS CONCRETE PIPE
P.P.L.	PROJECT PROPERTY LINE
QUAN.	QUANTITY
R.	RADIUS
REINF.	REINFORCED
R.C.P.	REINFORCED CONCRETE PIPE
SIM.	SIMILAR
SPEC'S.	SPECIFICATIONS
SQ.	SQUARE
STRUCT.	STRUCTURAL
T.C.	TOP OF CURB
T.F.	TOP OF FRAME
T.W.	TOP OF WALL
T.R.	TRASH RECEPTACLE
TR.	TREAD
T.P.	TREE PIT
TYP.	TYPICAL
W.B.	WASTE BASKET
W.	WATER
W.P.	WATER PROOFING
W.M.V.	WATT MERCURY VAPOR
W.W.F.	WELDED WIRE FABRIC
T.B.E.	TOP OF BENCH
W.S.	WATER STOP
E.W.	EACH WAY
E.F.	EACH FACE

LIST OF DRAWINGS

SP-1-A - Notes Legend & Abbreviations
SP-1 - Site Plan 1/8"
SP-2 - Dimension Plan 1/8"
~~SP-3 - Pavement Pattern Plan 1/8"~~
SP-4 - Plumbing Plan 1/8"
SP-5 - Electrical Plan 1/8"
SP-6 - Utility Plan 1/16"
~~SP-7 - Planting Plan 1/16"~~
SP-8 - Site Improvement Details
SP-9 - Site Improvement Details
SP-10 - Site Improvement Details
SP-11 - Site Improvement Details
SP-12 - SITE IMPROVEMENT DETAILS
SP-13 - SITE IMPROVEMENT DETAILS
SP-14 - FOUNTAIN WEIR PLAN AND DETAILS
SP-15 - MECHANICAL ROOM PLAN & DETAIL
SP-16 - PLUMBING DETAILS
SP-17 - MECHANICAL ROOM PLUMBING PLAN & DETAILS
SP-18 - ELECTRICAL DETAILS
SP-19 - MAIN FOUNTAIN & FUNDATION PLAN

M. PAUL FRIEDBERG & ASSOCIATES

LANDSCAPE ARCHITECTURE
URBAN DESIGN

4 W. 62 ST. NEW YORK
N.Y. 10023

STATE OF NEW YORK — M. PAUL FRIEDBERG — No. 05179 — LICENSED PROFESSIONAL ENGINEER

REGISTRATION IN MINNESOTA APPLIED FOR AND PENDING.

REVISIONS	DATE

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

PEAVEY PARK PLAZA

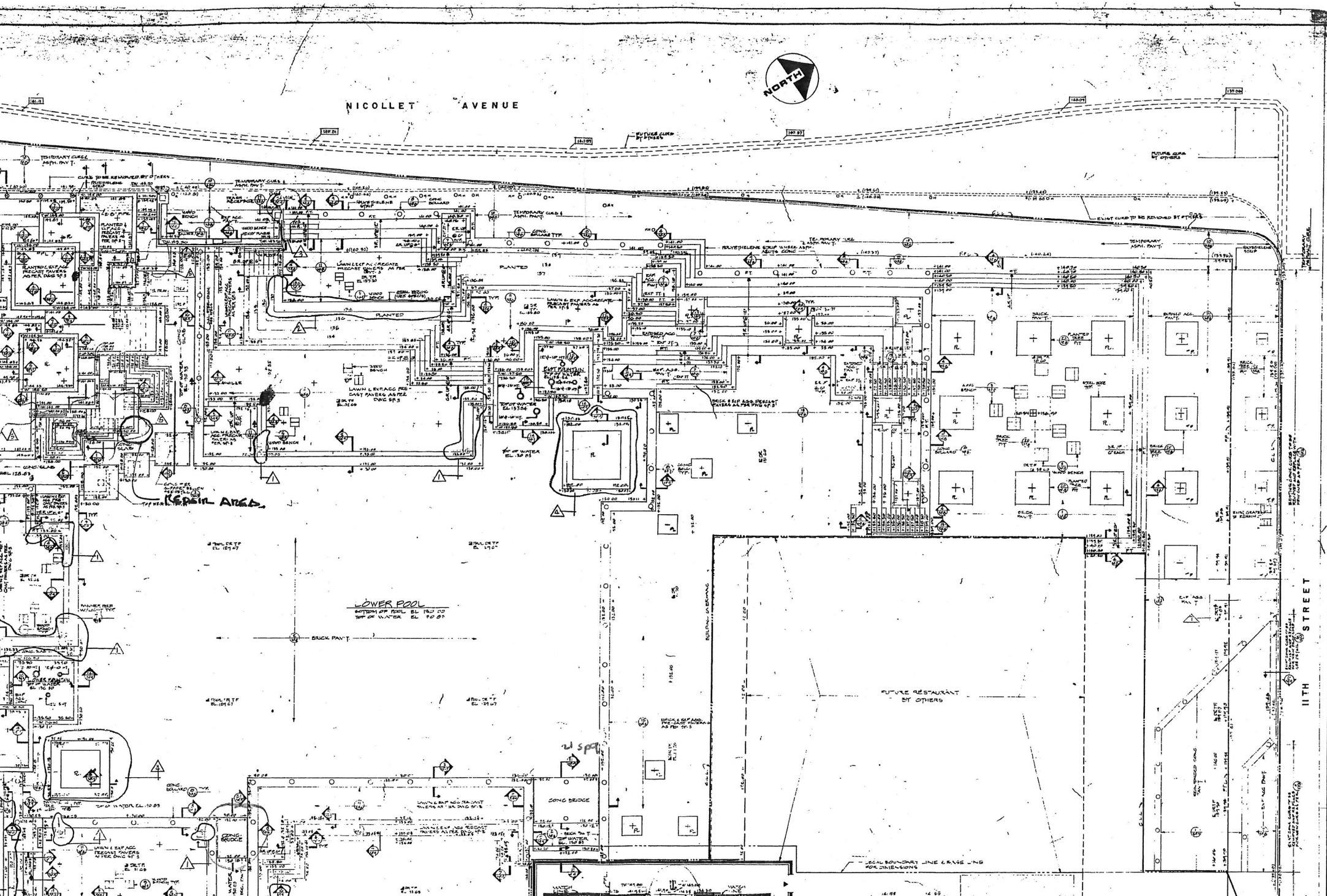
MINNEAPOLIS, MINNESOTA

ASSOCIATE IN CHARGE	A.C. PEARSON
PROJECT ARCHITECT	JAY A. GOLD
DRAWN BY	CHECKED BY
SCALE	DATE 5-21-74

TITLE

NOTES LEGEND AND ABBREVIATIONS

MPF JOB #	DWG. No.
2073	SP-1A



M. PAUL FRIEDBERG & ASSOCIATES

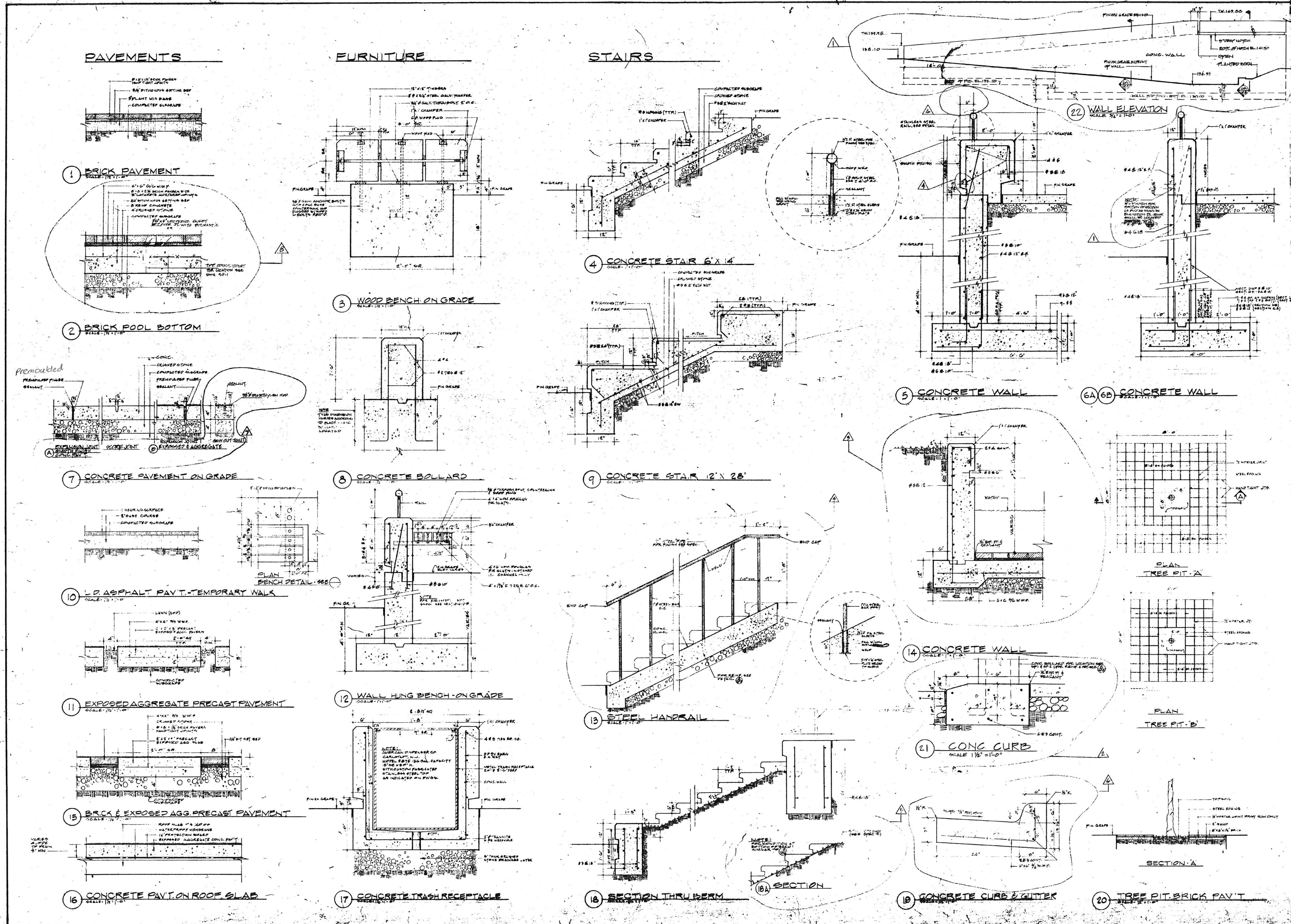
LANDSCAPE ARCHITECTURE
URBAN DESIGN

4 W. 62 ST. NEW YORK
N.Y. 10023

STATE OF NEW YORK
ARTHUR GATENBY
NO. 26196
LICENSED PROFESSIONAL ENGINEER

REGISTRATION IN MINNESOTA APPLIED FOR LANDSCAPING.

REVISIONS	DATE
ADDENDA #1	6-6-74
1 RELOCATED BANNER POLE REVISED MTG. DETAIL.	
2 PROVIDED STEEL EDGING IN LIEU OF CONC. CURB	
3 DELETED RUNNEL & HANDRAIL MOUNTED ON RUNNEL, PROVIDED WALL MOUNTED HANDRAIL AS SHOWN	
4 REVISED WIDTH TOP OF WALL ELEVATION OF PLANTERS AT POOL	
5 REVISED DESIGN	
6 DELETED WALL RAILING	
7 DELETED PRODUCT ALTERNATE NOTE.	



M. PAUL FRIEDBERG & ASSOCIATES

LANDSCAPE ARCHITECTURE
URBAN DESIGN

4 W. 62 ST. NEW YORK
N.Y. 10023

REGISTRATION IN MINNESOTA APPLIED FOR AND PENDING.

REVISIONS	DATE
ADDENDA #1	
1 ADDED WALL ELEVATION No. 22 & REVISED DETAIL 6A SHOWING NOTCH	
2 ADDED CONC. CURB DETAIL No. 21	
3 REVISED DETAIL 14	
4 ADDED DIMENSION TO HANDRAIL DETAIL No. 13 & No. 5 AND DIMENSION AT NOTCH ON DETAIL No. 5	
5 ADDED DET. 18 A SHOWING CONDITION @ TOP OF BERM	
6 REVISED DETAIL 19 FOR CONC. CURB	
7 ADDED CLASSIFICATION FOR SMOOTH CONC. PAV'T & EXPOSED AGGREGATE CONC. PAV'T AS TYPE A & B RESPECTIVELY	
8 REVISED DET. #2	

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

PEAVEY PARK PLAZA

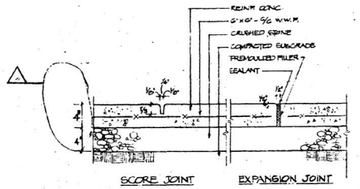
MINNEAPOLIS, MINNESOTA

ASSOCIATE IN CHARGE	A.C. PEARSON
PROJECT ARCHITECT	JAY A. GOLD
DRAWN BY	CHECKED BY
SCALE AS SHOWN	DATE 5-21-74

TITLE

SITE IMPROVEMENT DETAILS

2071 SP-8



1 REINFORCED CONCRETE PAVEMENT
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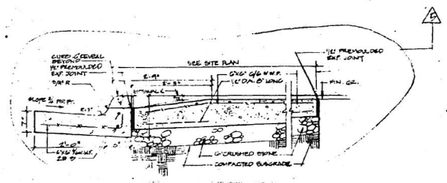

6 DROPPED CURB SECTION
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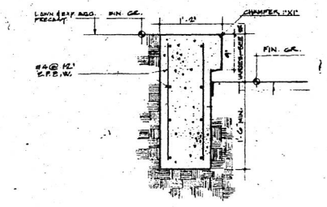

7 CONC. CURB
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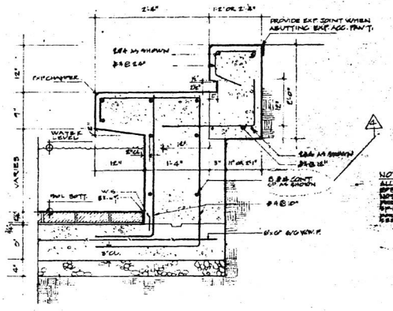

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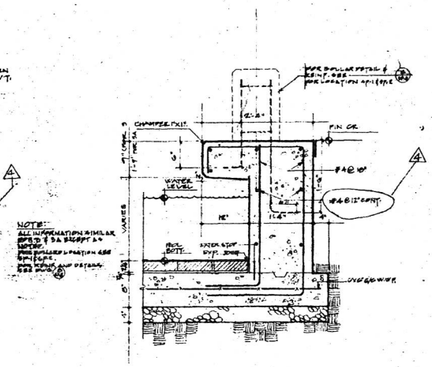

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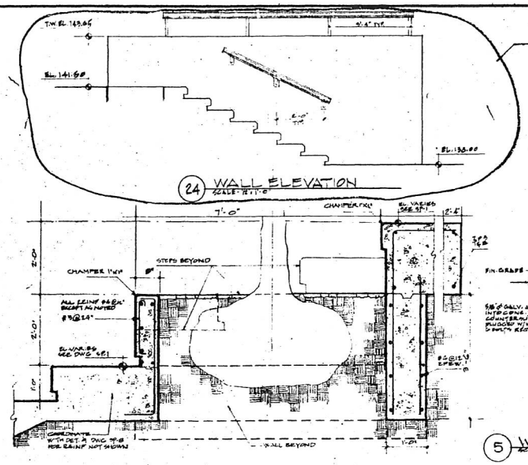
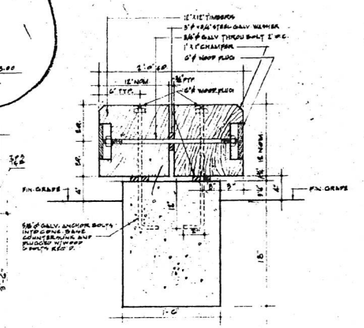
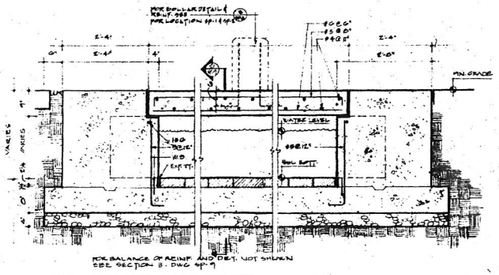
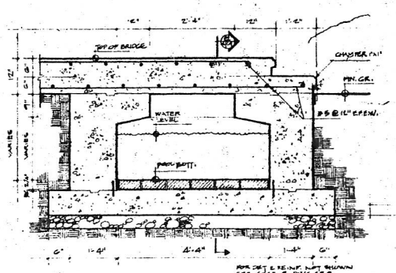
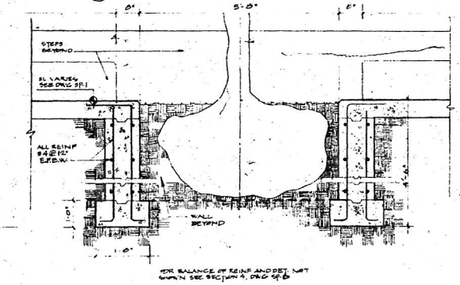
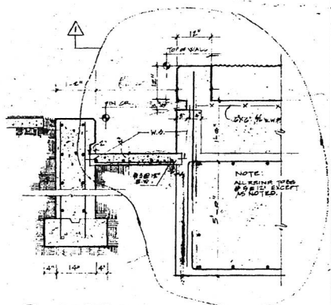


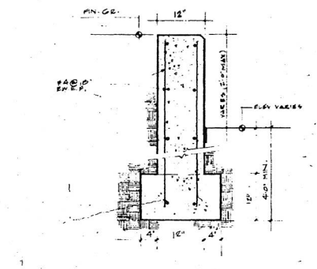


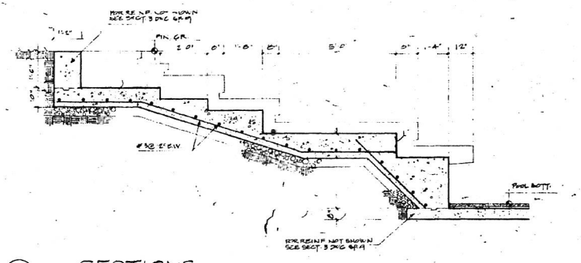


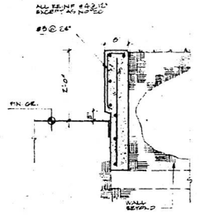


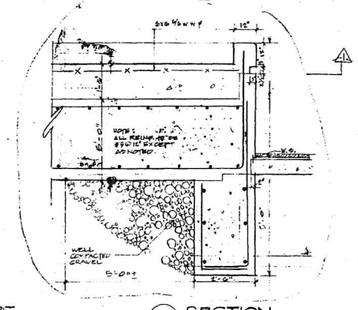


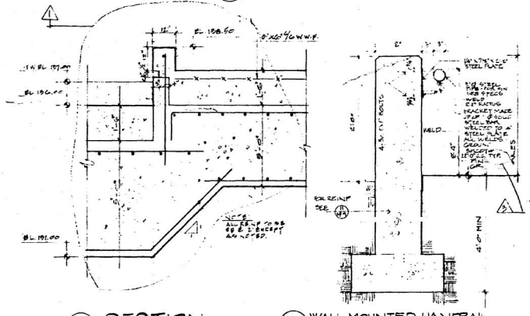


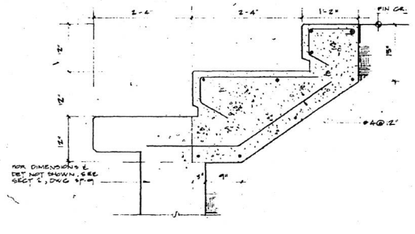


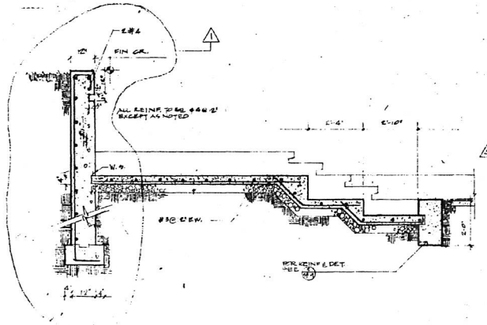


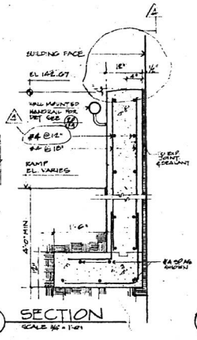


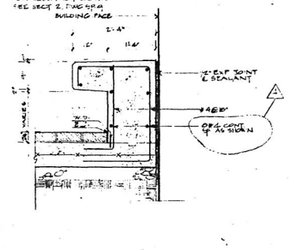


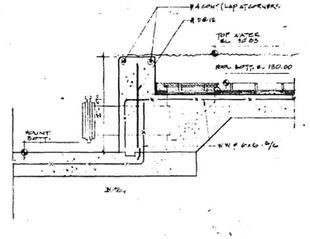


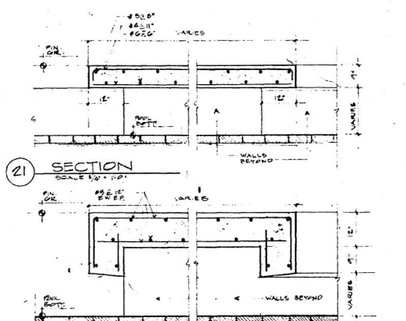












M. PAUL FRIEDBERG & ASSOCIATES

LANDSCAPE ARCHITECTURE
URBAN DESIGN

4 W. 69 ST. NEW YORK
N.Y. 10023

REGISTRATION IN MINNESOTA APPLIED FOR, AND PENDING

REVISIONS	DATE
APPENDIX # 1	6-8-76

1. REVISED DETAILS NO. 10, 12, 13 & 17 FOR LOCATION OF EXPANSION WATER STOP LOCATION & REINF. INFORMATION
2. ADDED WALL ELEVATION NO. 24 SHOWING HANDRAIL LOCATION
3. REVISED DETAIL NO. 20 SHOWING SPACING FOR HANDRAIL SUPPORT
4. REVISED DETAILS NO. 8, 9, 16 & 23 FOR REINFORCING & WALL ELEVATION SHOWN ON SHT. 27
5. REVISED SHT. NO. 6 FOR STEP CURED
6. REVISED DETAIL No. 1 FOR DIMENSION @ CONC. PAVT

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

PEAVEY PARK PLAZA
MINNEAPOLIS, MINNESOTA

ASSOCIATE IN CHARGE	A.C. PEARSON
PROJECT ARCHITECT	JAY A. GOLD
DRAWN BY	CHECKED BY
SCALE 1" AS SHOWN	DATE 5-21-76

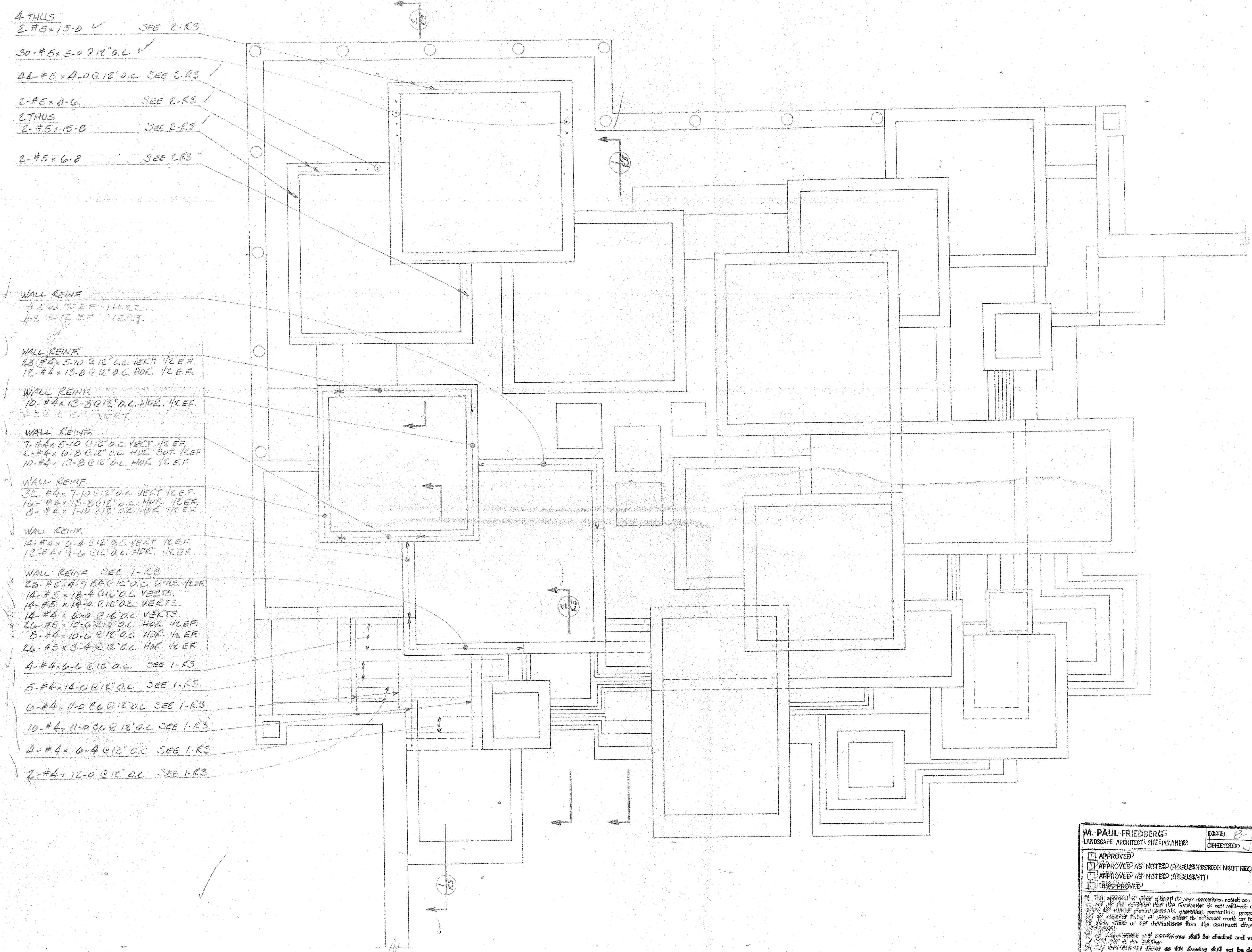
TITLE

SITE IMPROVEMENT DETAILS

1073 | SP-9

APPENDIX B: ORIGINAL SHOP DRAWINGS

BY COWIN & CO.
7.29.1974



FOR APPROVAL ONLY

RECEIVED AUG 6 1974 NYSTROM CONSTRUCTORS

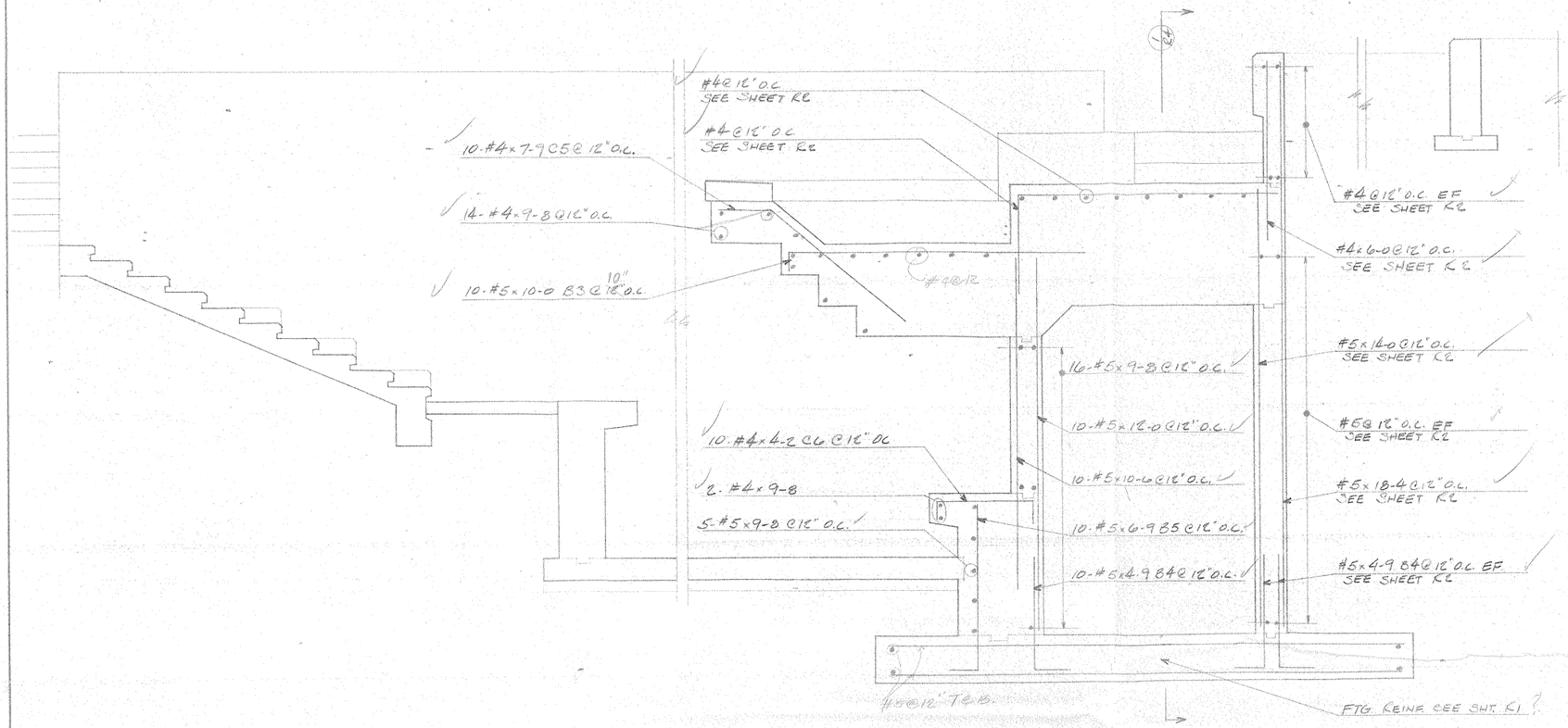
M. PAUL FRIEDBERG
LANDSCAPE ARCHITECT - SITE PLANNER
DATE 8-16-74
CHECKED JR

☐ APPROVED
☑ APPROVED AS NOTED (RESUBMISSION NOT REQUIRED)
☐ APPROVED AS NOTED (RESUBMIT)
☐ DISAPPROVED

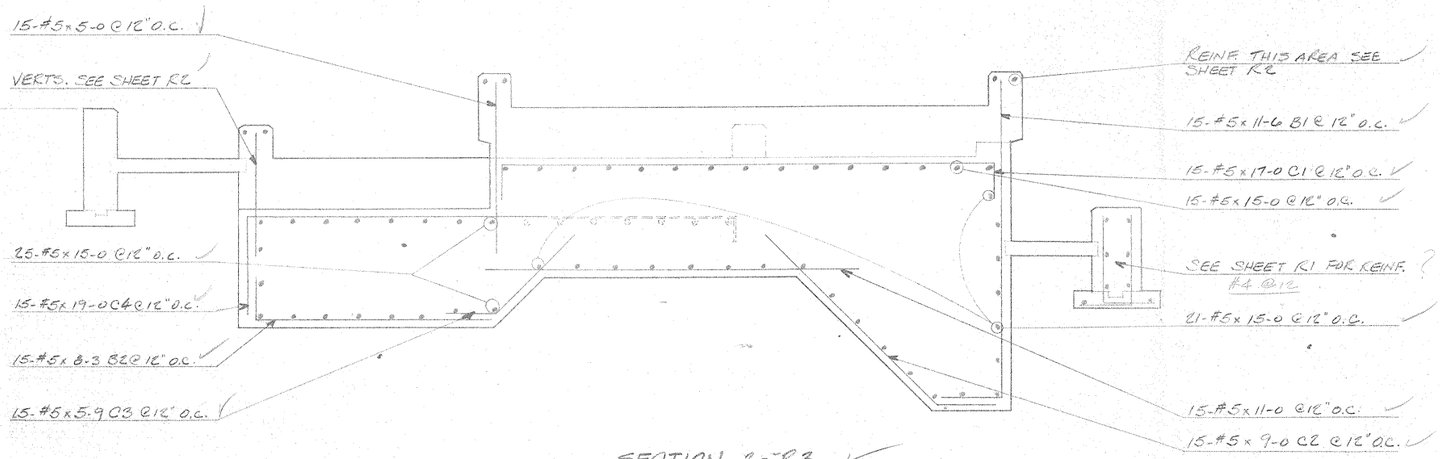
(1) This approval is given subject to any corrections noted on the drawing and to the condition that the Contractor is not relieved of responsibility for correct measurements, quantities, materials, proper connection or accurate fitting of parts either to adjacent work or to parts of the same work, or for deviations from the contract drawings and specifications.
(2) All measurements and conditions shall be checked and verified by Contractor at the building.
(3) Any Corrections shown on this drawing shall not be deemed an order for extra work.
(4) No change shall be made on any approved drawing without the written authorization of the owner.

COWIN & CO., INC.
720 FIRST ST. S.W. – P.O. BOX 2806 – NEW BRIGHTON
636-2600 (AREA 612)

REINFORCING PLAN
FOR
JOB PEAVY PARK PLAZA
LOCATION MINNEAPOLIS MINNESOTA
CONTRACTOR NYSTROM CONSTRUCTORS
ARCHITECT M. PAUL FRIEDBERG & ASSOCIATES
DRAWN BY GS. DATE 7-29-74 SHEET NO. R2 OF
REVISED
APPROVED
JOB NO. 4270



SECTION 1-R3



SECTION 2-R3

FOR APPROVAL ONLY

RECEIVED AUG 6 1974 BUILDING INSPECTIONS

M. PAUL FRIEDBERG
LANDSCAPE ARCHITECT - SITE PLANNER

DATE 8-16-74
CHECKED JE

- ☐ APPROVED
- ☑ APPROVED AS NOTED (RESUBMISSION NOT REQUIRED)
- ☐ APPROVED AS NOTED (RESUBMIT)
- ☐ DISAPPROVED

(1) This approval is given subject to any corrections noted on the drawing and to the condition that the Contractor is not relieved of responsibility for correct measurements, quantities, materials, proper connection or requisite fitting of parts either to adjacent work or to parts of the same work, or for deviations from the contract drawings and specifications.
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JOB

COWIN & CO., INC.
720 FIRST ST. S.W. – P.O. BOX 2806 – NEW BRIGHTON
636-2600 (AREA 612)

REINFORCING PLAN

FOR

JOB HEAVY PARK PLAZA

LOCATION MINNEAPOLIS, MINNESOTA

CONTRACTOR NYSTROM CONSTRUCTORS

ARCHITECT M. PAUL FRIEDBERG & ASSOCIATES

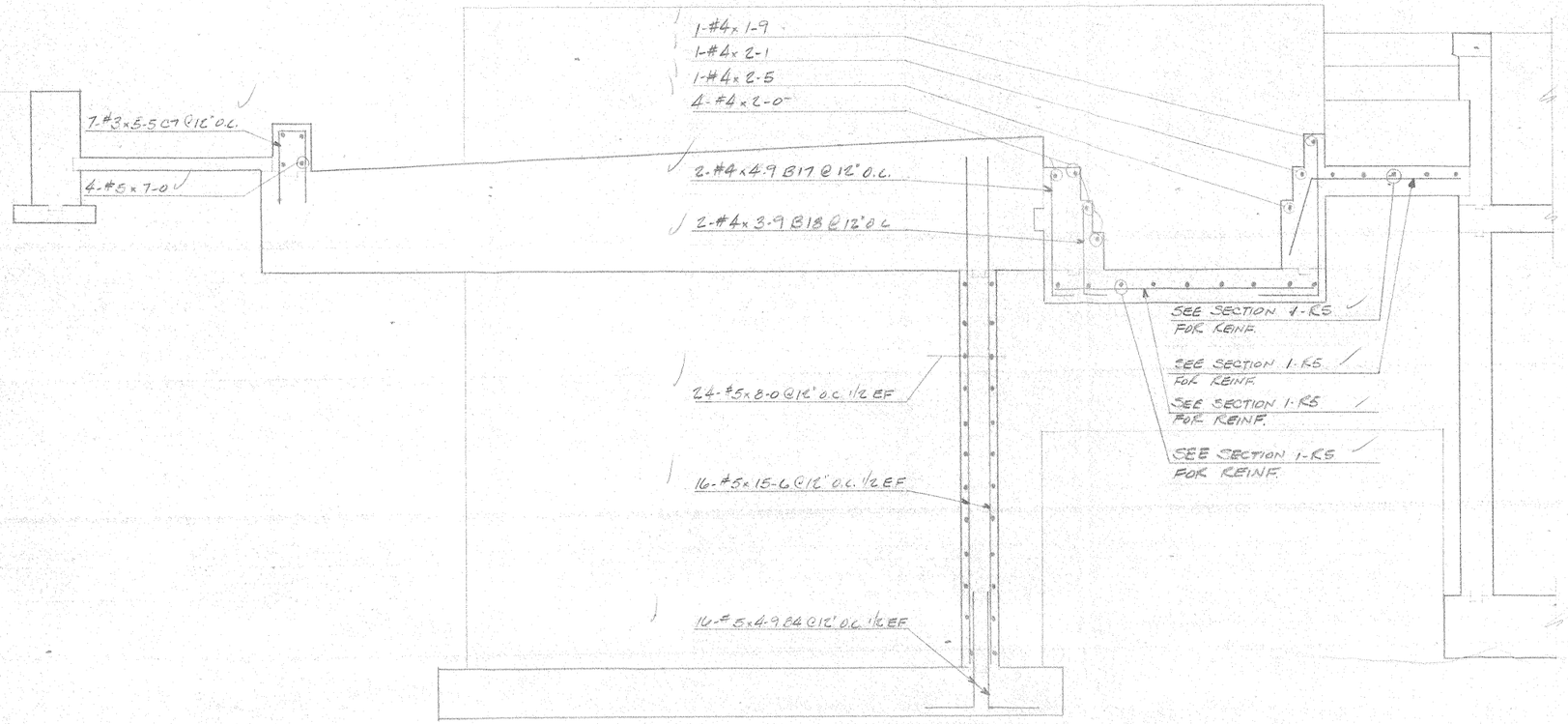
DRAWN BY G.S. DATE 7-2-74

REVISED

APPROVED

SHEET NO. R3 OF

JOB NO. 4270



SECTION 1-R4

FOR APPROVAL ONLY

DEVELOPMENT - SITE PLANNER

DATE 3-16-74

CHECKED JR

- ☐ APPROVED
- ☑ APPROVED AS NOTED (RESUBMISSION NOT REQUIRED)
- ☐ APPROVED AS NOTED (RESUBMIT)
- ☐ DISAPPROVED

(1) This approval is given subject to any corrections noted on the drawing and to the condition that the Contractor is not relieved of responsibility for correct measurements, quantities, materials, proper connection or requisite fitting of parts either to adjacent work or to parts of the same work, or for deviations from the contract drawings and specifications.
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(4) No change shall be made on any approved drawing without the written authorization of the owner.

DNS [illegible]

COWIN & CO., INC.
720 FIRST ST. S.W. – P.O. BOX 2806 – NEW BRIGHTON
636-2600 (AREA 612)

REINFORCING PLAN

FOR

JOB HEAVY PARK PLAZA

LOCATION MINNEAPOLIS, MINNESOTA

CONTRACTOR NYSTROM CONSTRUCTORS

ARCHITECT M. PAUL FRIEDBURG & ASSOCIATES

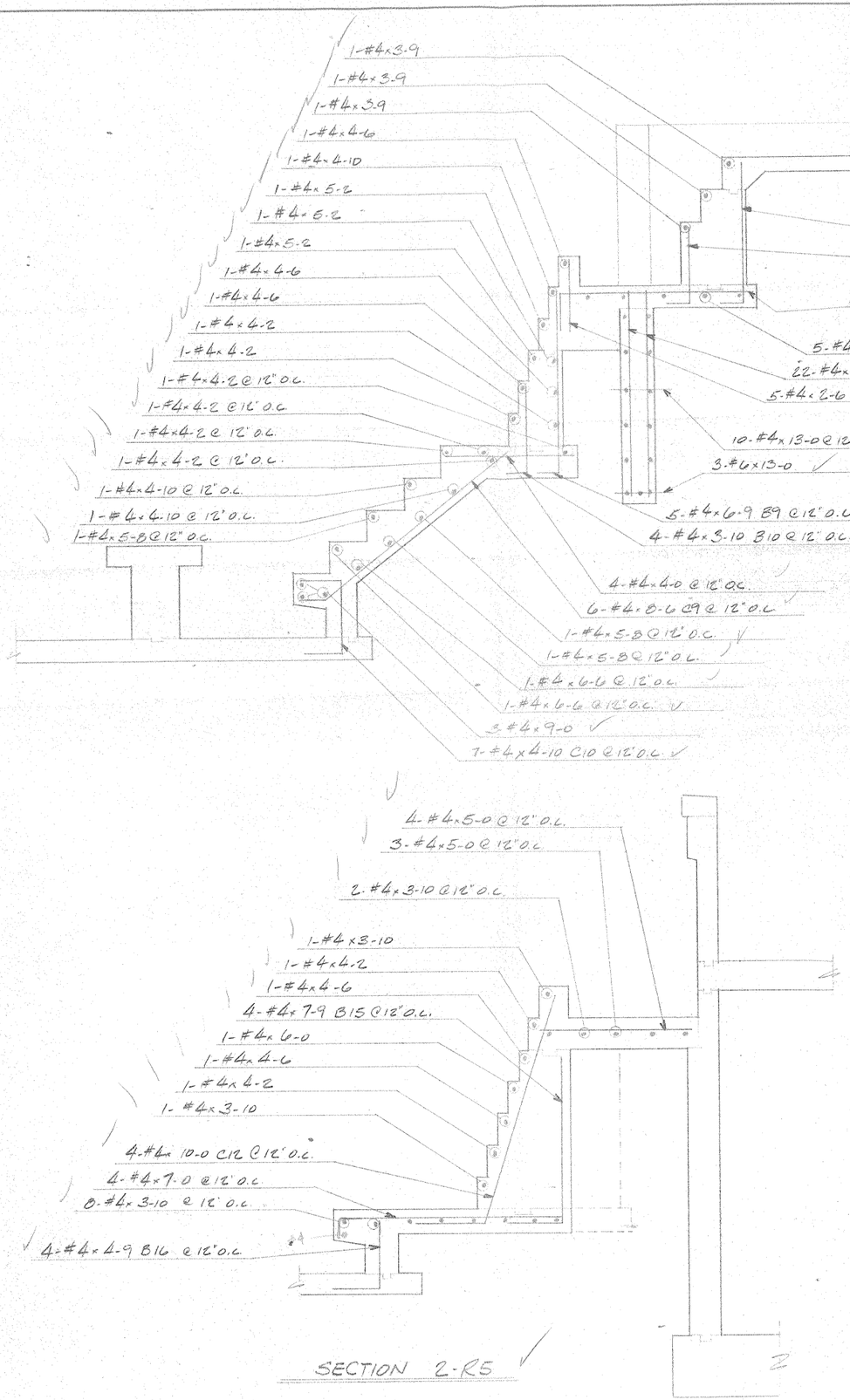
DRAWN BY GS | DATE 7-9-74

REVISED

APPROVED

SHEET NO. R4 OF

JOB NO. 4270



SECTION 1-R5

SECTION 2-R5

M. PAUL FRIEDBERG
LANDSCAPE ARCHITECT - SITE PLANNER

DATE 8-16-74
CHECKED MF

- ☐ APPROVED
- ☑ APPROVED AS NOTED (RESUBMISSION NOT REQUIRED)
- ☐ APPROVED AS NOTED (RESUBMIT)
- ☐ DISAPPROVED

(1) This approval is given subject to any corrections noted on the drawings and to the condition that the Contractor is not relieved of responsibility for correct measurements, quantities, materials, proper connection or requisite fitting of parts either to adjacent work or to parts of the same work, or for deviations from the contract drawings and specifications.
(2) All measurements and conditions shall be checked and verified by the Contractor at the building.
(3) Any Corrections shown on this drawing shall not be deemed an order for extra work.
(4) No change shall be made on any approved drawing without the written authorization of the owner.

JOB 2077

FOR APPROVAL ONLY

COWIN & CO., INC.
720 FIRST ST. S.W. – P.O. BOX 2806 – NEW BRIGHTON
636-2600 (AREA 612)

REINFORCING PLAN
FOR
JOB PEAVY PARK PLAZA
LOCATION MINNEAPOLIS MINNESOTA
CONTRACTOR NYSTROM CONSTRUCTORS
ARCHITECT M. PAUL FRIEDBERG & ASSOCIATES

DRAWN BY GS DATE 8-2-74
REVISED
APPROVED
SHEET NO. R5 OF
JOB NO. 4270

APPENDIX C: ORIGINAL SPECIFICATIONS

BY M/ PAUL FRIEDBERG & ASSOCIATES
1974

APPENDIX D: PETROGRAPHIC TESTING

BY AMERICAN ENGINEERING TESTING
2016

AMERICAN ENGINEERING TESTING, INC.

CONSULTANTS
- ENVIRONMENTAL
- GEOTECHNICAL
- MATERIALS
- FORENSICS

March 29, 2016

Ms. Denita Lemmon
Miller Dunwiddie Architecture, Inc.
123 N 3rd Street, Suite 104
Minneapolis, MN 55401-1657

RE: Peavey Plaza Fountain Rehab
Nicollet Mall
Between 11th and 12th Streets South
Minneapolis, Minnesota
Thin Section Analysis
AET Project No. 05-06658

Dear Ms. Lemmon,

This report presents the results of our petrographic examination of thin sections produced from the three concrete core samples submitted to us by Ms. Denita Lemmon of Miller Dunwiddie Architecture, Inc. on March 23, 2015. The 95mm (3-3/4") diameter cores were labeled 1 - Retaining Wall Near 12th Street, 2 – Exterior Wall of Lower Pool, and 3- Elevated Waterfall Feature; and measured 121mm (4-3/4"), 197mm (7-3/4"), and 178mm (7") in length, respectively. We understand the concrete represented by the three core samples was produced as part of the original construction of the fountain in 1975.

Conclusions

1. Each of the concretes was placed at a similar moderate to low water-to-cement ratio; estimated to be between 0.40 to 0.45 with 4 to 9% residual unhydrated portland cement particles. The presence of mineral admixtures or pozzolanic admixtures was not detected in any of the samples. Secondary ettringite observed in samples 2 and 3 is an indication that the concretes have been saturated for significant periods of time after initial set of the concrete. Further, hydration of the portland cement grains was also more advanced in samples 2 and 3. The concrete in each of the three cores was in good condition. Carbonation in all three samples was relatively shallow for the age of the concrete.

2. Iron oxide staining observed at the outer surface of core 3 exhibited a profile, in thin section and in lapped profile, indicative of acidic attack. The top approximately 0.5 mm of the paste was very friable and was stained reddish-brown to orange-brown. The stain appears to have been produced by a combination of oxidation of iron bearing minerals within the fine aggregate and from the ferrite (iron phase) present in the portland cement. In thin section, this paste is opaque (black) when viewed with cross-polarized light and occurs directly over carbonated paste. The acid attack may be due to exposer to mildly acidic rain water; however, similar profiles have also been produced by exposure to very soft water.

Procedures

A profile of each concrete was saw-cut and lapped for visual inspection. The water/cementitious of the concrete was estimated by viewing a thin section, produced from each concrete, under a Nikon E600 polarizing light microscope at magnifications of up to 1000x. Thin section analysis was performed in accordance with Standard Operating Procedure 24-LAB-009, "Determining the Water/Cement of Portland Cement Concrete, AET Method." An additional, smaller, sawcut subdivision of each concrete sample is epoxy impregnated, highly polished, and then attached to a glass slide using an optically clear epoxy. Excess sample is sawcut from the glass and the thin slice remaining on the slide is lapped and polished until the concrete reaches 25 microns or less in thickness. Thin section analysis allows for the observation of portland cement morphology, including: phase identification, an estimate of the amount of residual material, and spatial relationships. Also, the presence and relative amounts of supplementary cementitious materials and pozzolans may be identified and estimated.

The concrete samples will be retained for a period of 30 days and then will be discarded unless we are otherwise notified.

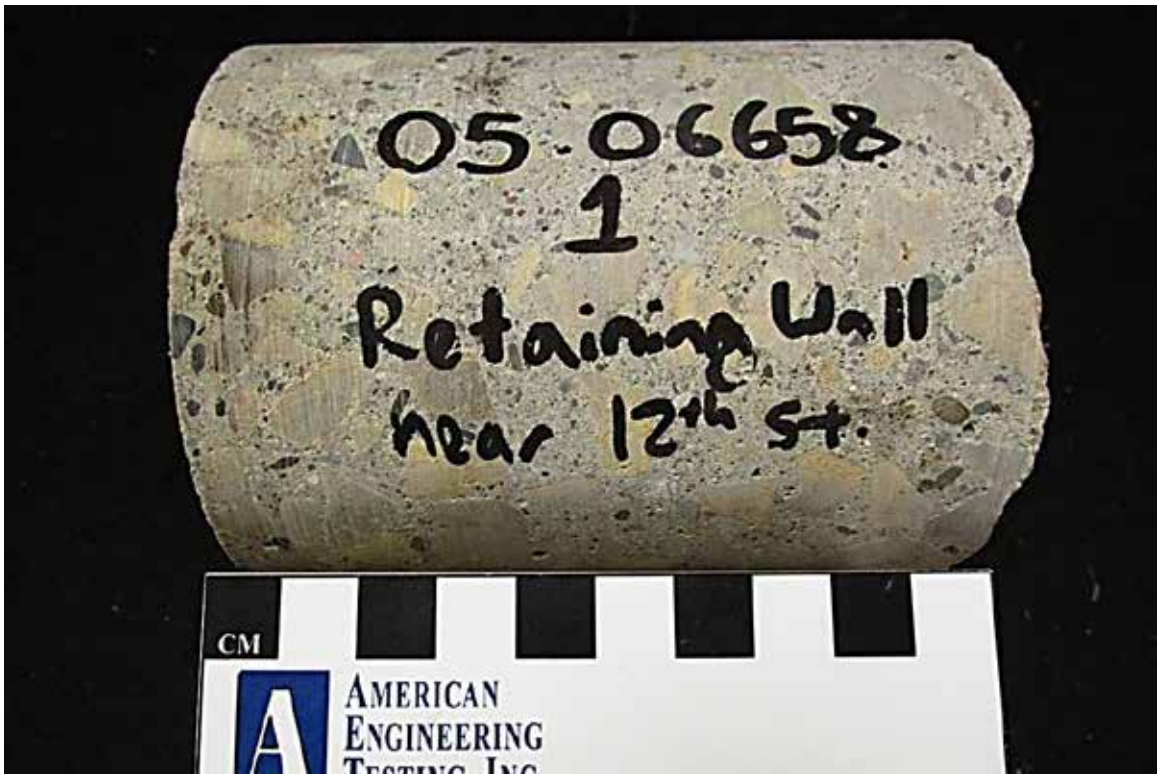
Prepared By:
American Engineering Testing, Inc.

Christine A. Tillema
Senior Petrographer
Phone: 651-659-1353
ctillema@amengtest.com

AET PROJECT NO: 05-06658 **DATE:** MARCH 29, 2016

PROJECT: PEAVEY PLAZA FOUNTAIN REHAB
NICOLLET MALL BETWEEN 11TH & 12TH STREETS SOUTH

PHOTO: 1



SAMPLE ID: 1 **DESCRIPTION:** Overall profile of the core as received, with the outer surface oriented to the left.

PHOTO: 2

SAMPLE ID: 1 **DESCRIPTION:** Outer surface of the core as received. Much of the formed outer surface has been shallowly ground away during coring.

AET PROJECT NO: 05-06658 **DATE:** MARCH 29, 2016

PROJECT: PEAVEY PLAZA FOUNTAIN REHAB
NICOLLET MALL BETWEEN 11TH & 12TH STREETS SOUTH

PHOTO: 3

SAMPLE ID: 2 **DESCRIPTION:** Overall profile of the core as received, with the outer surface oriented to the left.

PHOTO: 4

SAMPLE ID: 2 **DESCRIPTION:** The formed outer surface of the core as received. Minor mortar erosion has exposed many fine aggregate particles.

AET PROJECT NO: 05-06658 **DATE:** MARCH 29, 2016

PROJECT: PEAVEY PLAZA FOUNTAIN REHAB
NICOLLET MALL BETWEEN 11TH & 12TH STREETS SOUTH

PHOTO: 5

SAMPLE ID: 3 **DESCRIPTION:** Overall profile of the core as received, with the outer surface oriented to the left.

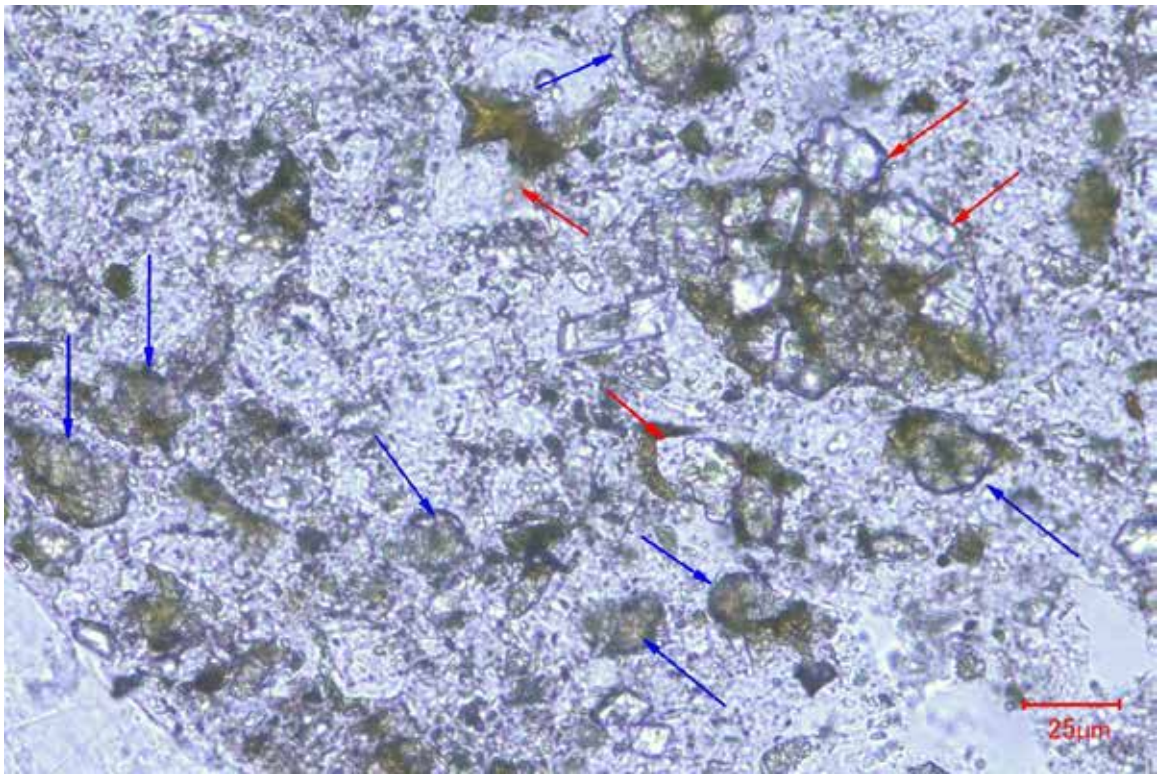
PHOTO: 6

SAMPLE ID: 3 **DESCRIPTION:** The outer surface of the core as received. Severe mortar erosion has exposed many coarse aggregate particles.

AET PROJECT NO: 05-06658 **DATE:** MARCH 29, 2016

PROJECT: PEAVEY PLAZA FOUNTAIN REHAB
NICOLLET MALL BETWEEN 11TH & 12TH STREETS SOUTH

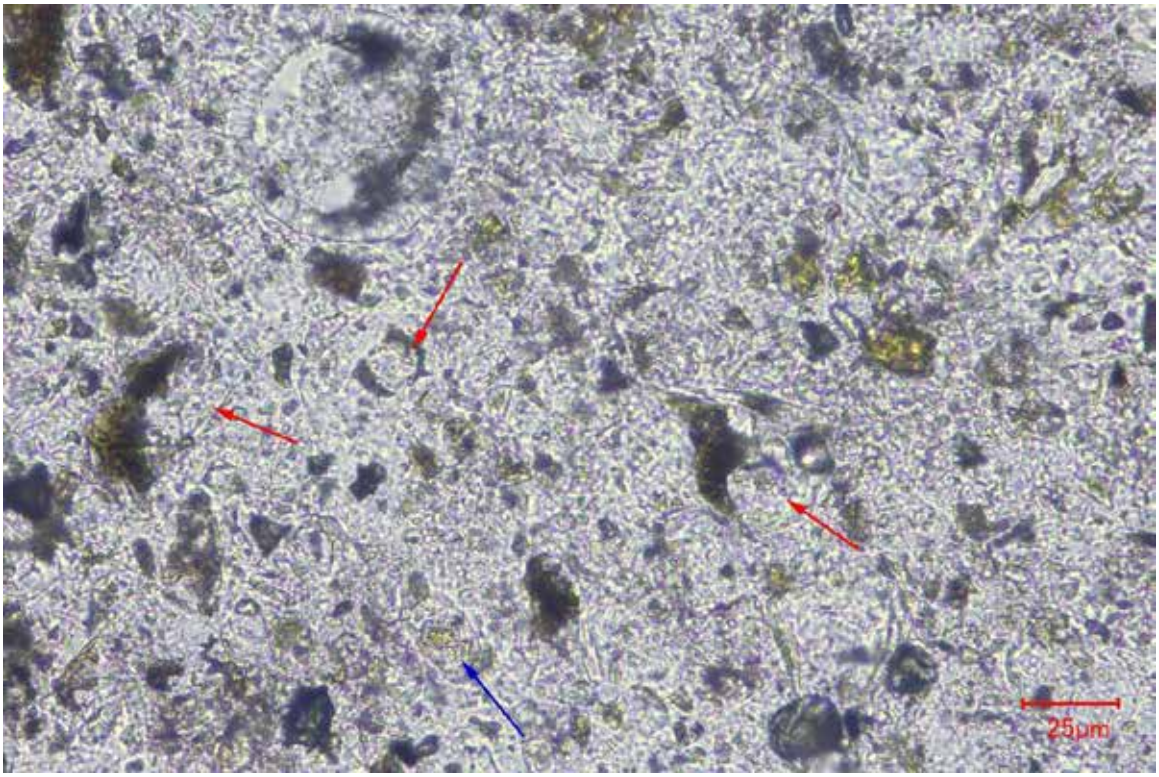
PHOTO: 7



SAMPLE ID: 1
MAG: 400x

DESCRIPTION: Moderately to fully-hydrated residual and relict alite (red arrows) and Low to moderately hydrated residual belite (blue arrows) portland cement clinker particles in a thin section of concrete paste viewed with transmitted plane-polarized light.

PHOTO: 8



SAMPLE ID: 2
MAG: 400x

DESCRIPTION: Fully-hydrated relict alite (red arrows) and a fully hydrated relict belite (blue arrow) portland cement clinker particles in a thin section of concrete paste viewed with transmitted plane-polarized light.

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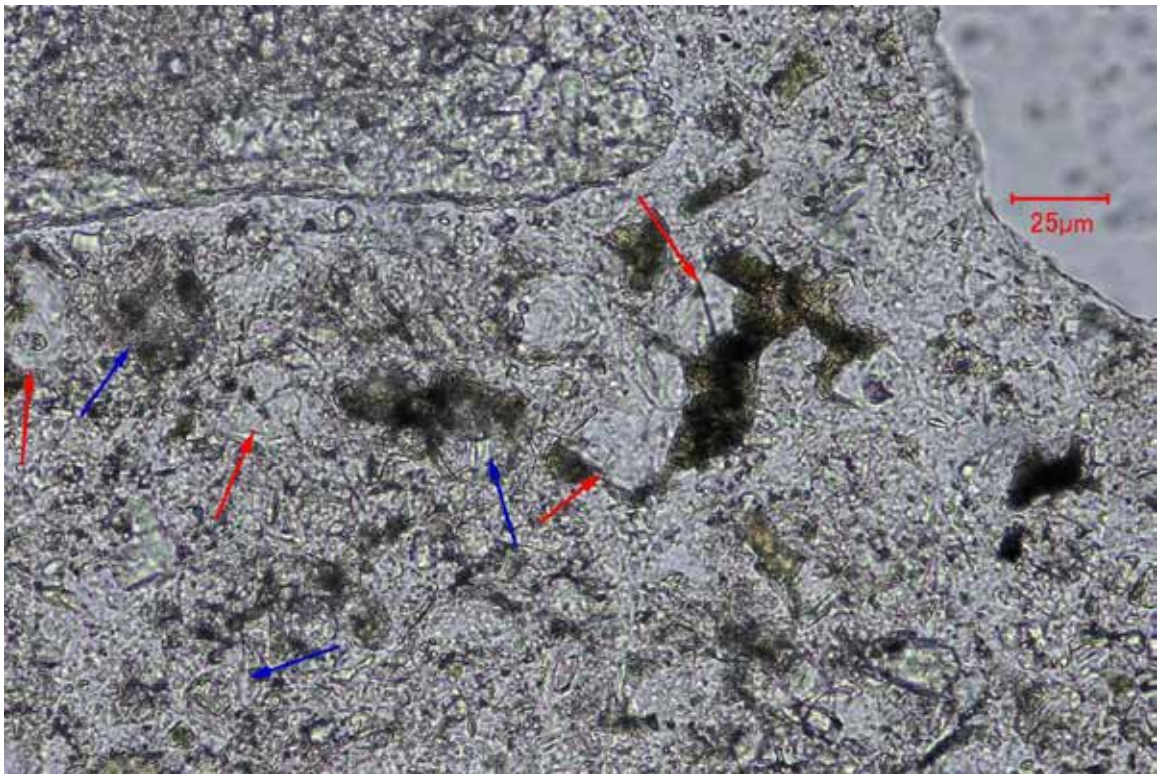
NICOLLET MALL BETWEEN 11TH & 12TH STREETS SOUTH

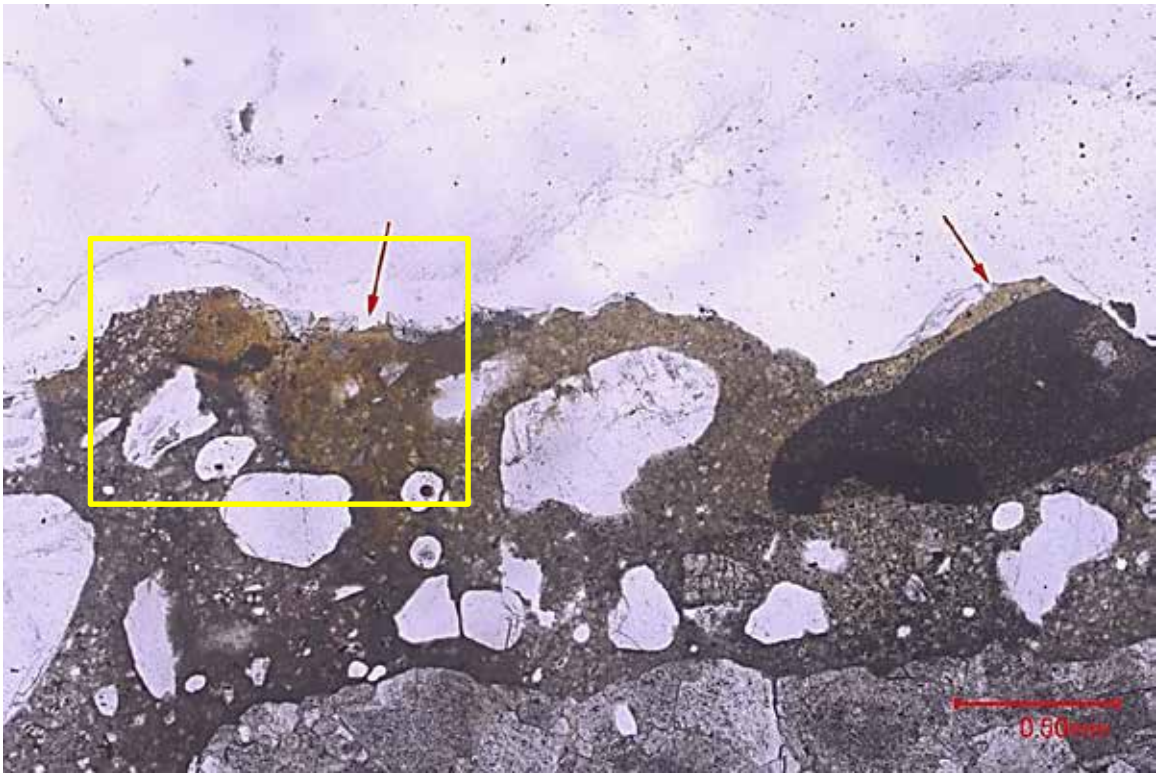
PHOTO: 9



SAMPLE ID: 3
MAG: 400x

DESCRIPTION: Fully-hydrated relict alite (red arrows) and well hydrated residual belite (blue arrows) portland cement clinker particles in a thin section of concrete paste viewed with transmitted plane-polarized light.

PHOTO: 10



SAMPLE ID: 3
MAG: 40x

DESCRIPTION: Orange-brown discoloration of the paste at the outer surface was up to 0.5 mm thick. The yellow box gives the approximate location of photos 11 and 12. Thin section of concrete viewed with transmitted plane-polarized light.

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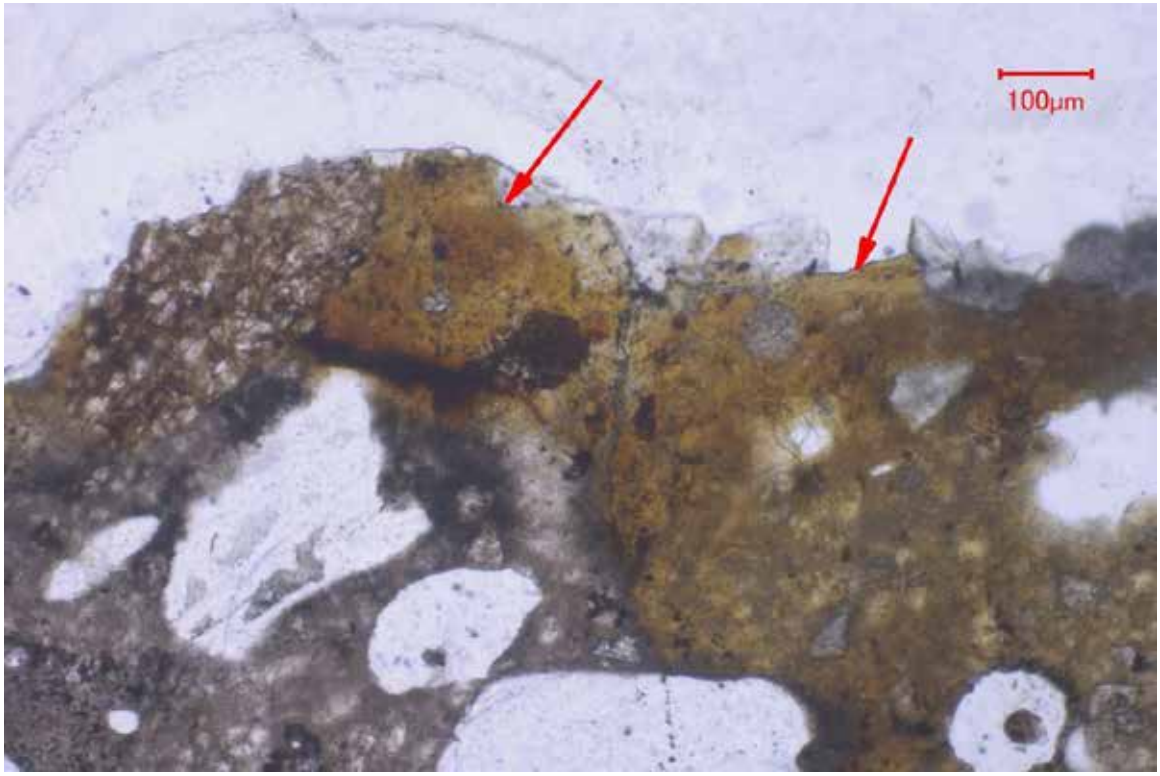
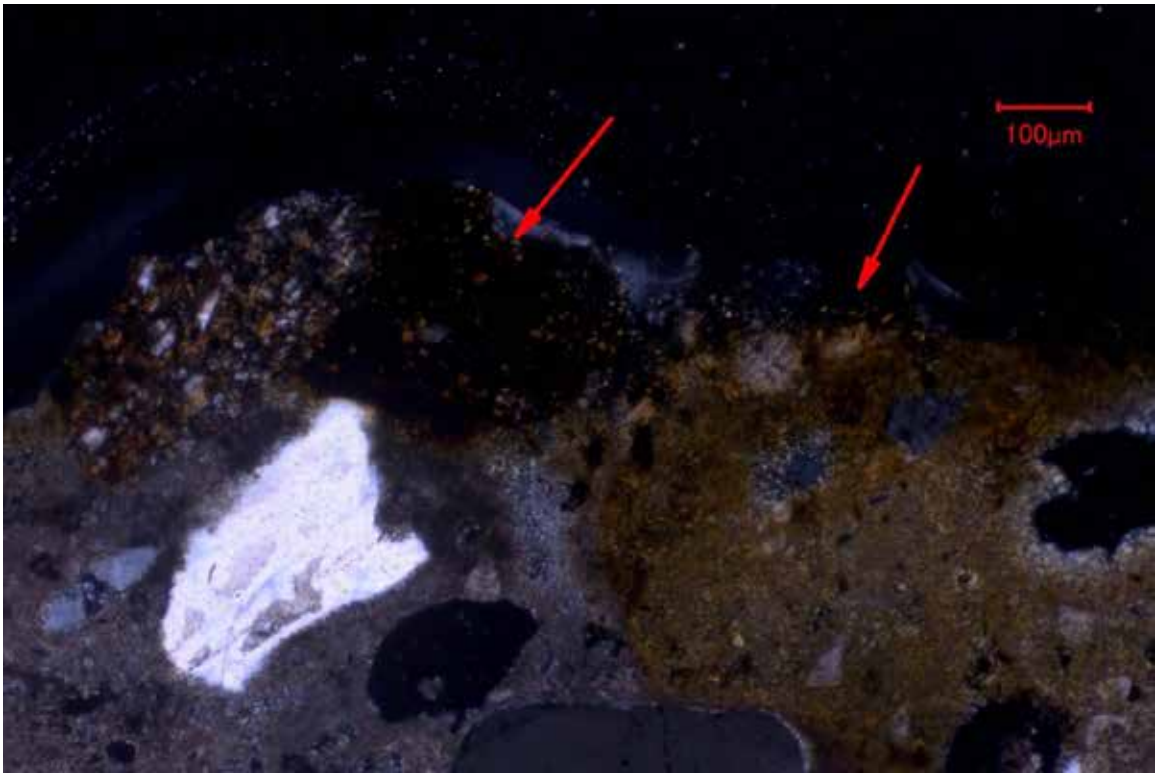
PHOTO: 11



SAMPLE ID: 3
MAG: 100x

DESCRIPTION: Magnified view of area within the yellow box in photo 10, showing stained paste. Thin section of concrete paste viewed with transmitted plane-polarized light.

PHOTO: 12



SAMPLE ID: 3
MAG: 100x

DESCRIPTION: Same area as pictured above, viewed with transmitted cross-polarized light. The top most stained paste is opaque (black). The carbonated paste beneath is stained on the right side of the photomicrograph and unstained on the left side. A layer of opaque paste is typically observed in concrete that has experienced acid attack.

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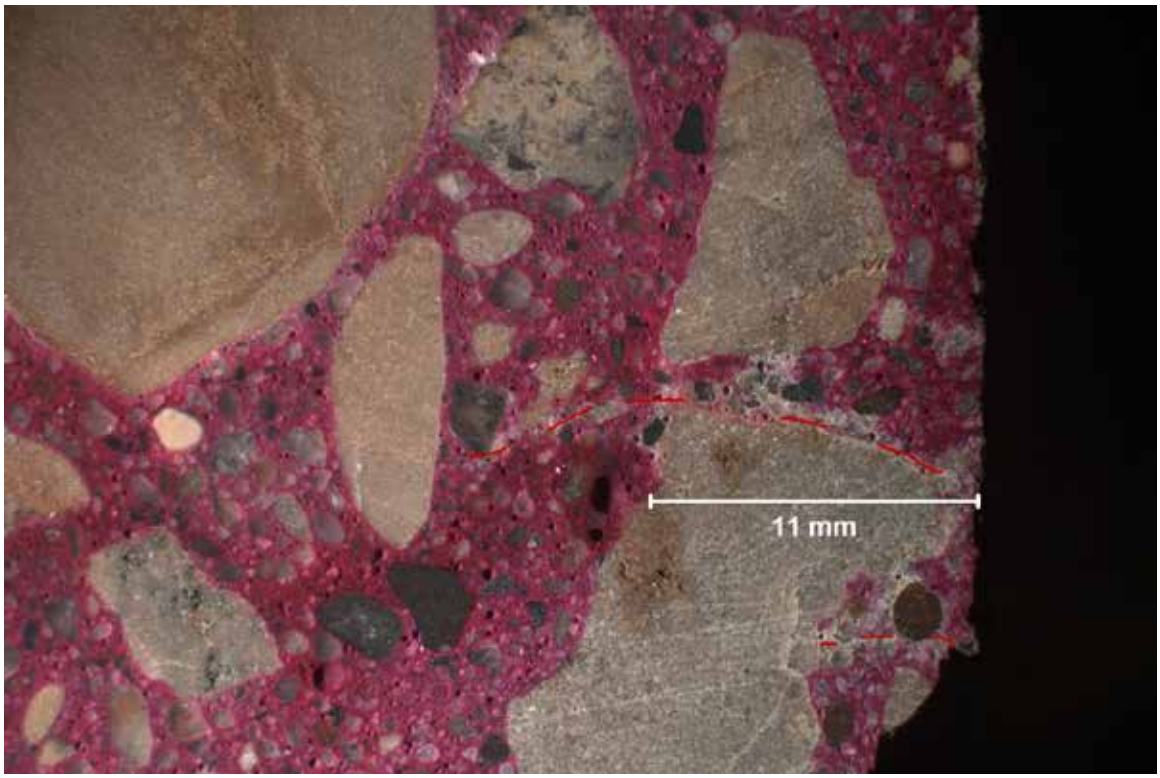
NICOLLET MALL BETWEEN 11TH & 12TH STREETS SOUTH

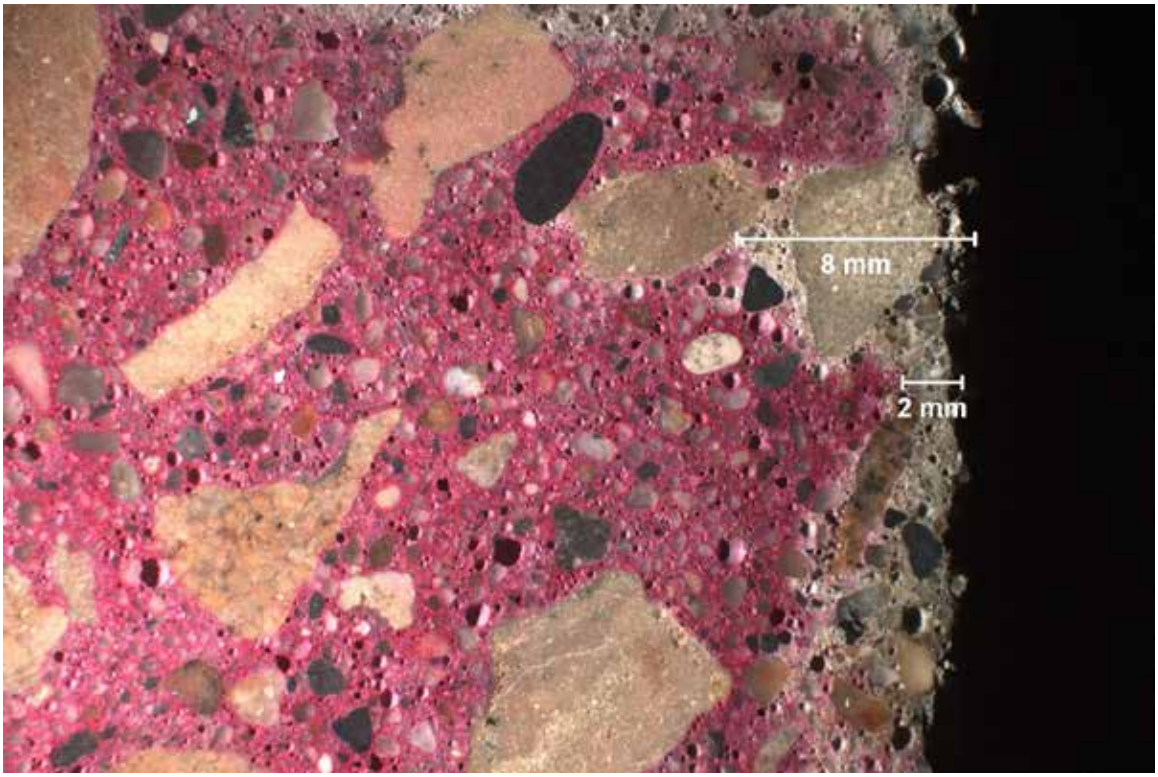
PHOTO: 13



SAMPLE ID: 1
MAG: 5x

DESCRIPTION: Carbonation (unstained paste) measured from the outer surface of the core was mostly negligible and proceeded up to 11 mm (7/16") depth along microcracking (approximated by the dashed red lines). Observed on a saw-cut and lapped profile of the sample treated with the pH indicator phenolphthalein.

PHOTO: 14



SAMPLE ID: 2
MAG: 5x

DESCRIPTION: Carbonation (unstained paste) ranged from 2 mm (1/16") to 8 mm (5/16") depth from the outer surface of the sample. Observed on a saw-cut and lapped profile of the concrete treated with the pH indicator phenolphthalein.

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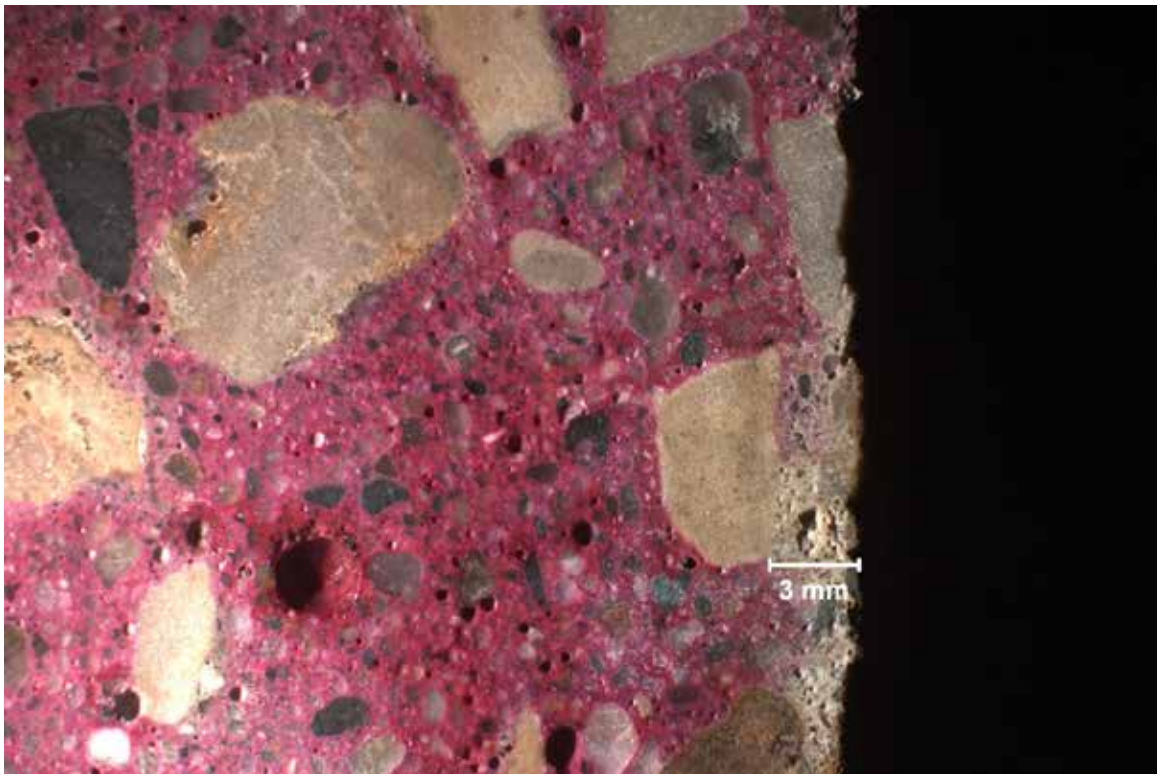
NICOLLET MALL BETWEEN 11TH & 12TH STREETS SOUTH

PHOTO: 15



SAMPLE ID: 3
MAG: 5x

DESCRIPTION: Carbonation (unstained paste) ranged from negligible to 3 mm (1/8") depth from the outer surface of the sample. Observed on a saw-cut and lapped profile of the concrete treated with the pH indicator phenolphthalein.